THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Appellants:	Groux, et al.
Appl. No.:	10/622,115
Conf. No.:	1635
Filed:	July 18, 2003
Title:	MILK PRODUCT WHICH CAN BE FOAMED BY SHAKING
Art Unit:	1794
Examiner:	Jyoti Chawla
Docket No.:	3712036-00486

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

APPELLANTS' APPEAL BRIEF

Sir:

Appellants submit this Appeal Brief in support of the Notice of Appeal filed on September 10, 2010. This Appeal is taken from the Final Rejection dated May 14, 2010 and the Advisory Action dated August 19, 2010.

I. REAL PARTY IN INTEREST

The real party in interest for the above-identified patent application on Appeal is Nestec S.A. by virtue of an Assignment dated October 31, 2003 and recorded at reel 014677, frame 0157 in the United States Patent and Trademark Office.

II. RELATED APPEALS AND INTERFERENCES

Appellants' legal representative and the Assignee of the above-identified patent application do not know of any prior or pending appeals, interferences or judicial proceedings which may be related to, directly affect or be directly affected by or have a bearing on the Board's decision with respect to the above-identified Appeal.

III. STATUS OF CLAIMS

Claims 1, 3-4, 9-12 and 15-17 are pending in the above-identified patent application. Claims 2, 5-8, 13 and 14 were previously canceled without prejudice or disclaimer. Claims 1, 3, 6-11 and 26-27 stand rejected. Therefore, Claims 1, 3-4, 9-12 and 15-17 are being appealed in this Brief. A copy of the appealed claims is included in the Claims Appendix.

IV. STATUS OF AMENDMENTS

A non-final Office Action was mailed on October 2, 2009, in which the Examiner rejected Claims 1, 3-12 and 14-17 under 35 U.S.C. §112, first and second paragraphs, and Claims 1 and 3-17 under 35 U.S.C. §103. Appellants filed a Response to the non-final Office Action on February 2, 2010, in which Appellants amended the claims and argued against the enablement, indefiniteness and obviousness rejections. A final Office Action was mailed on May 14, 2010, in which the Examiner maintained the rejections of Claims 1, 3, 9-12 and 14-17 under 35 U.S.C. §103 and objected to Claims 9 and 14 for reasons of informalities. Appellants filed a Response to the final Office Action on July 30, 2010, in which Appellants argued against the objections and obviousness rejections, and amended the claims for clarification purposes. An Advisory Action was sent by the Examiner on August 19, 2010, in which the Examiner entered the amendments, withdrew the objections to Claims 9 and 14, and maintained the obviousness rejections. Appellants filed a Notice of Appeal on September 10, 2010. Copies of the non-final Office Action, final Office Action, and Advisory Action are included in the Evidence Appendix as Exhibits A, B and C, respectively.

V. SUMMARY OF CLAIMED SUBJECT MATTER

A summary of the invention by way of reference to the specification and/or figures for each of the independent claims is provided as follows:

Claim 1 is directed to a milk product for providing at room temperature, either by shaking or with a foaming device, a foamed composition for beverages (page 1, lines 20-32; page 2, lines 10-13), the milk product comprising 0 to 40% fat by weight (page 1, lines 20-32; page 2, lines 10-13), 5% to 23% non-fat solids by weight (page 1, lines 20-32; page 2, lines 10-13), 0.3 to 3% propylene glycol monostearate by weight (page 1, lines 20-32; page 2, line 22-page 3, line 13), 0.005 to 0.15% sorbitan tristearate by weight (page 1, lines 20-32; page 2, line 22-page 3, line 13), 0.005 to 0.015% unsaturated monoglyceride by weight (page 1, lines 20-32; page 2, line 22-page 3, line 13), a foam stabilizer (page 1, lines 20-32; page 2, lines 10-13), and water (page 1, lines 20-32; page 2, lines 10-13), the milk product is not cooled below room temperature to provide the foamed composition (page 3, lines 14-20), wherein the milk product is high temperature processed using a process selected from the group consisting of pasteurization, sterilization, UHT treatment and combinations thereof (page 1, line 33-page 2, line 2; page 3, lines 14-20) and wherein the foam stabilizer is selected from the group consisting of a sodium alginate, a mixture of microcrystalline cellulose and carboxymethylcellulose and combinations thereof (page 1, lines 20-32; page 2, line 22-page 3, line 13).

Claim 12 is directed to a method of forming a milk product for providing at room temperature, either by shaking or with a foaming device, a foamed composition for beverages (page 1, line 20-page 2, line 2; page 2, lines 10-13), the method comprising:

dissolving 0.3 to 3% propylene glycol monostearate (PGMS) by weight (page 1, line 20-page 2, line 2; page 2, line 22-page 3, line 13), 0.005 to 0.15% sorbitan tristearate (STS) by weight (page 1, line 20-page 2, line 2; page 2, line 22-page 3, line 13), and 0.005 to 0.015% unsaturated monoglyceride by weight (page 1, line 20-page 2, line 2; page 2, line 22-page 3, line 13) in skim milk to form an emulsion (page 1, line 20-page 2, line 2);

adding cream to the emulsion (page 1, line 33-page 2, line 2);

adding a foam stabilizer to the emulsion (page 1, line 33-page 2, line 2; page 2, lines 10-13; page 2, line 22-page 3, line 13);

dissolving the emulsion in water to form the milk product (page 1, line 33-page 2, line 2); and

high temperature processing the milk product using a process selected from the group consisting of pasteurization, sterilization, UHT treatment and combinations thereof (page 1, line 33-page 2, line 2; page 3, lines 14-20), wherein the foam stabilizer is selected from the group consisting of a sodium alginate, a mixture of microcrystalline cellulose and carboxymethylcellulose and combinations thereof (page 1, line 20-page 2, line 2; page 2, line 22-page 3, line 13), and wherein the milk product is not cooled below room temperature to provide the foamed composition (Examples 3-6).

Although specification citations are given in accordance with C.F.R. 1.192(c), these reference numerals and citations are merely examples of where support may be found in the specification for the terms used in this section of the Brief. There is no intention to suggest in any way that the terms of the claims are limited to the examples in the specification. As demonstrated by the references numerals and citations below, the claims are fully supported by the specification as required by law. However, it is improper under the law to read limitations from the specification into the claims. Pointing out specification support for the claim terminology as is done here to comply with rule 1.192(c) does not in any way limit the scope of the claims to those examples from which they find support. Nor does this exercise provide a mechanism for circumventing the law precluding reading limitations into the claims from the specification. In short, the references numerals and specification citations are not to be construed as claim limitations or in any way used to limit the scope of the claims.

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

1. Claims 1, 3-4, 9-11, 15 and 17 are rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 4,107,343 to Petricca ("*Petricca*") in view of the combination of Dictionary of Food ingredients by Igoe et al ("*Igoe*") and U.S. Patent No. 3,519,440 to Staackmann ("*Staackmann*"). Copies of *Petricca*, *Igoe*, and *Staackmann* are included in the Evidence Appendix as Exhibits D, E and F, respectively.

2. Claims 12, 14 and 16 are rejected under 35 U.S.C. §103(a) as being unpatentable over *Petricca* in view of the combination of *Igoe*, *Staackmann*, and further in view of U.S. Patent No. 4,888,194 to Anderson et al. ("*Anderson*"). A Copy of *Anderson* is included in the Evidence Appendix as Exhibit G, respectively.

VII. ARGUMENT

A. LEGAL STANDARDS

Obviousness under 35 U.S.C. § 103

The Federal Circuit has held that the legal determination of an obviousness rejection under 35 U.S.C. § 103 is:

> whether the claimed invention as a whole would have been obvious to a person of ordinary skill in the art at the time the invention was made…The foundational facts for the prima facie case of obviousness are: (1) the scope and content of the prior art; (2) the difference between the prior art and the claimed invention; and (3) the level of ordinary skill in the art…Moreover, objective indicia such as commercial success and long felt need are relevant to the determination of obviousness…Thus, each obviousness determination rests on its own facts.

In re Mayne, 41 U.S.P.Q. 2d 1451, 1453 (Fed. Cir. 1997).

In making this determination, the Patent Office has the initial burden of proving a *prima facie* case of obviousness. *In re Rijckaert*, 28 U.S.P.Q. 2d 1955, 1956 (Fed. Cir. 1993). This burden may only be overcome "by showing some objective teaching in the prior art or that knowledge generally available to one of ordinary skill in the art would lead that individual to combine the relevant teachings." *In re Fine*, 5 U.S.P.Q. 2d 1596, 1598 (Fed. Cir. 1988). "If the examination at the initial stage does not produce a prima facie case of unpatentability, then without more the applicant is entitled to grant of the patent." *In re Oetiker*, 24 U.S.P.Q. 2d 1443, 1444 (Fed. Cir. 1992).

Moreover, the Patent Office must provide explicit reasons why the claimed invention is obvious in view of the prior art. The Supreme Court has emphasized that when formulating a rejection under 35 U.S.C. § 103(a) based upon a combination of prior art elements it remains necessary to identify the reason why a person of ordinary skill in the art would have combined the prior art elements in the manner claimed. *KSR v. Teleflex*, 127 S. Ct. 1727 (2007).

Of course, references must be considered as a whole and those portions teaching against or away from the claimed invention must be considered. *Bausch & Lomb, Inc. v. Barnes-Hind/Hydrocurve Inc.*, 796 F.2d 443 (Fed. Cir. 1986). "A prior art reference may be considered to teach away when a person of ordinary skill, upon reading the reference would be discouraged from following the path set out in the reference, or would be led in a direction divergent from the

path that was taken by the Applicant." *Monarch Knitting Machinery Corp. v. Fukuhara Industrial Trading Co., Ltd.*, 139 F.3d 1009 (Fed. Cir. 1998), quoting, *In re Gurley*, 27 F.3d 551 (Fed. Cir. 1994).

B. THE CLAIMED INVENTION

Claim 1 is directed to a milk product for providing at room temperature, either by shaking or with a foaming device, a foamed composition for beverages. The milk product includes 0 to 40% fat by weight, 5% to 23% non-fat solids by weight, 0.3 to 3% propylene glycol monostearate by weight, 0.005 to 0.15% sorbitan tristearate by weight, 0.005 to 0.015% unsaturated monoglyceride by weight, a foam stabilizer, and water. The milk product is not cooled below room temperature to provide the foamed composition. The milk product is high temperature processed using a process selected from the group consisting of pasteurization, sterilization, UHT treatment or combinations thereof. The foam stabilizer is selected from the group consisting of a sodium alginate, a mixture of microcrystalline cellulose and carboxymethylcellulose or combinations thereof.

Claim 12 is directed to a method of forming a milk product for providing at room temperature, either by shaking or with a foaming device, a foamed composition for beverages. The method includes the steps of dissolving 0.3 to 3% propylene glycol monostearate (PGMS) by weight, 0.005 to 0.15% sorbitan tristearate (STS) by weight, and 0.005 to 0.015% unsaturated monoglyceride by weight in skim milk to form an emulsion, adding cream to the emulsion, adding a foam stabilizer to the emulsion, and dissolving the emulsion in water to form the milk product. The method further includes the step of high temperature processing the milk product using a process selected from the group consisting of pasteurization, sterilization, UHT treatment or combinations thereof. The foam stabilizer is selected from the group consisting of a sodium alginate, a mixture of microcrystalline cellulose and carboxymethylcellulose or combinations thereof. The milk product is not cooled below room temperature to provide the foamed composition.

C. THE REJECTION OF CLAIMS 1, 3-4, 9-11, 15 AND 17 UNDER 35 U.S.C. §103(a) SHOULD BE REVERSED BECAUSE THE EXAMINER HAS FAILED TO ESTABLISH A PRIMA FACIE CASE OF OBVIOUSNESS

Appellants respectfully submit that the obviousness rejection of Claims 1, 3-4, 9-11, 15 and 17 should be reversed because the Examiner has failed to establish a *prima facie* case of obviousness. In the final Office Action, the Examiner asserts that the combination of *Petricca, Igoe* and *Staackman* renders the claimed subject matter obvious. See, final Office Action, pages 3-11. However, the Examiner has failed to establish a *prima facie* case of obviousness because the cited references fail to disclose each and every element of the present claims. Further, there exists no reason why the skilled artisan would have combined *Petricca, Igoe* and *Staackman* to arrive at the presently claimed subject matter.

1. The Cited References Fail to Disclose Each and Every Element of the Present Claims

Independent Claim 1 is directed to a milk product for providing at room temperature, either by shaking or with a foaming device, a foamed composition for beverages, the milk product comprising 0 to 40% fat by weight, 5% to 23% non-fat solids by weight, 0.3 to 3% propylene glycol monostearate by weight, 0.005 to 0.15% sorbitan tristearate by weight, 0.005 to 0.015% unsaturated monoglyceride by weight, a foam stabilizer, and water, the milk product is not cooled below room temperature to provide the foamed composition, wherein the milk product is high temperature processed using a process selected from the group consisting of pasteurization, sterilization, UHT treatment and combinations thereof and wherein the foam stabilizer is selected from the group consisting of a sodium alginate, a mixture of microcrystalline cellulose and carboxymethylcellulose and combinations thereof. The milk products of the present claims may be foamed by simple hand shaking, independently of the way the product is produced. The milk products do not require cooling prior to foaming, and the foam remains stable for a long time on cold and hot beverages. The products also provide a good whitening powder. See, specification, page 2, lines 5-9. In contrast, Appellants respectfully submit that the cited references are deficient with respect to the present claims.

Appellants submit that the cited references, alone or in combination, fail to disclose or suggest a milk product for providing at room temperature, either by shaking or with a foaming device, a foamed composition for beverages, the milk product comprising 0.3 to 3% propylene glycol monostearate by weight, 0.005 to 0.15% sorbitan tristearate by weight, and 0.005 to 0.015% unsaturated monoglyceride by weight as required, in part, by independent Claims 1 and 12. The Examiner admits that *Petricca* fails to disclose unsaturated monoglycerides and their amount in the composition. See, non-final Office Action, page 7, lines 9-11.

Appellants submit, however, that *Staackmann* fails to remedy the deficiencies of *Petricca*. *Staackmann* discloses 0.1% of a mixture of mono and diglycerides. See, *Staackmann,* column 5, Composition A. The 0.1% level is clearly outside the range of unsaturated monoglycerides in the present claims. Even the Examiner asserts that *Staackmann* discloses "unsaturated monoglycerides and combinations thereof in the amount of 0.1%" by citing Composition A. See, Advisory Action, page 4, lines 23-24. However, Composition A clearly discloses a "[m]ixture of mono and diglycerides" in the amount of 0.1%, which the Examiner asserts overlaps the presently claimed range of 0.005% to 0.15% unsaturated monoglycerides by weight. Because the specific amounts of each of the mono and diglycerides are not known, it cannot be determined how much of the "mixture" comprises monoglycerides. Therefore, *Staackmann* fails to remedy the deficiencies of *Petricca*.

Similarly, *Igoe* also fails to remedy the deficiencies of *Petricca*. Instead, *Igoe* discloses definitions of Polyoxyethylene (20) Sorbitan Monostearate and Polyoxyethylene (20) Sorbitan Tristearate. See, *Igoe,* page 111. At no place in the disclosure does *Igoe* disclose or suggest the presently claimed amounts of any unsaturated monoglycerides. Therefore, *Igoe* also fails to remedy the deficiencies of *Petricca*. As such, Appellants respectfully submit that the cited references fail to disclose or suggest each and every element of the present claims.

2. The Skilled Artisan Would Have No Reason to Combine the Cited References to Arrive at the Present Claims

Further, Appellants respectfully submit that the skilled artisan would have no reason to combine the cited references because the references teach away from each other and are directed toward products having completely different objectives. For example, *Petricca* is entirely

directed to a pourable, whippable, edible emulsion containing water, fat, sweetener, protein, thickener, buffer and emulsifiers. See, *Petricca*, Abstract. As a result, *Petricca* teaches a non-dairy (non-milk) emulsion. Each example and each formulation described in *Petricca* reinforces the non-dairy nature of the emulsion. See, *Petricca*, column 2, Tables I and II, and columns 5-8, Examples 1-6. Though milk is mentioned in *Petricca*, it is only taught as a diluent for the finished product emulsion. Therefore, milk is not part of the emulsion invention of *Petricca*. Even the "disperable protein" of the emulsion is disclosed as sodium caseinate, which is a milk derivative that is not a source of lactose and therefore an ingredient generally used in non-dairy products. In fact, Section 101.4(d) of Title 21 of the Code of Federal Regulations allows foods containing sodium caseinate to be labeled as non-dairy.

The Examiner asserts that "applicant is referred to *Petricca* Column 3, line 1 to Column 4, line 63" where it is allegedly disclosed that the composition includes milk components and can also include milk. See, final Office Action, page 14, line 28-page 15, line 2; Advisory Action, page 2, lines 22-29. However, the portion of *Petricca* cited by the Examiner fails to even mention milk until column 4, lines 60-63, where *Petricca* states that the emulsion of *Petricca* may be diluted with milk to form a final product. However, the emulsion itself does not include any milk, as previously discussed.

Further, Appellants reiterate that the mere fact that *Petricca* states that the emulsion may be diluted with milk does not change the fact that the entire reference, when viewed as a whole, is directed to a non-dairy (non-milk) emulsion. Indeed, the courts are clear that each reference in an obviousness rejection must be considered as a whole and those portions teaching against or away from each other and/or the claimed invention must be considered. *Bausch & Lomb, Inc. v. Barnes-Hind/Hydrocurve Inc.*, 796 F.2d 443 (Fed. Cir. 1986). "A prior art reference may be considered to teach away when a person of ordinary skill, upon reading the reference would be discouraged from following the path set out in the reference, or would be led in a direction divergent from the path that was taken by the Applicant." *Monarch Knitting Machinery Corp. v. Fukuhara Industrial Trading Co., Ltd.*, 139 F.3d 1009 (Fed. Cir. 1998), quoting, *In re Gurley*, 27 F.3d 551 (Fed. Cir. 1994).

Moreover, each example and each formulation described in *Petricca* reinforces the non-dairy nature of the emulsion. See, *Petricca*, column 2, Tables I and II, and columns 5-8,

Examples 1-6. As such, although milk is mentioned in *Petricca*, it is only taught as a diluent for the finished emulsion product. Therefore, milk is not part of the emulsion invention of *Petricca*.

In contrast to *Petricca*, *Staackmann* is entirely directed to providing a dairy product having storage stability and resistance to microbiological attack at room temperature. See, *Staackmann*, column 1, lines 49-68. Therefore, *Petricca* teaches essentially a non-dairy food product, which not only teaches away from *Staackmann*, but also teaches away from the present claims, which are directed to milk products.

As such, the products and methods of the cited references explicitly teach away from the combination with each other and are directed toward products having completely unrelated objectives. Accordingly, the skilled artisan would have no reason to combine the cited references to arrive at the present claims. Indeed, it would be a stretch for the skilled artisan, aimed at providing a milk product (dairy product) as claimed, to arrive at such a result by reviewing *Petricca*, which is aimed solely at providing a non-dairy whippable emulsion, in view of *Staackmann*, which is directed to a dairy product. Further, if the proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there exists no reason for the skilled artisan to make the proposed modification. *In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984).

The Examiner further states that "it would have been obvious to one of ordinary skill in the art at the time of the invention that sorbitan monostearate (*Petricca*) and sorbitan tristearate [*Igoe*] will function similarly when added to a whippable composition." See, final Office Action, page 7, lines 12-16. Appellants respectfully disagree and submit that, on one hand, *Igoe* discloses that sorbitan monostearate is water-dispersable, very hydrophilic and is used in whipped toppings. On the other hand, however, *Igoe* discloses that sorbitan tristearate is dispersible in fat, oil and water and is used in frozen desserts and coffee whiteners. See, *Igoe*, page 111. In view of the differences in dispersibilities alone, Appellants respectfully disagree with the Examiner's assertion that the two compounds would behave similarly, let alone as "functional equivalents." Indeed, as discussed in the specification, stability of foamed milk products is difficult to achieve due to, for example, sterilization and coagulation. Appellants submit that the skilled artisan would immediately appreciate that differences in dispersibility can cause serious impacts on stability of such products and, as a result, would not find sorbitan monostearate and sorbitan tristearate to be functional equivalents.

Appellants respectfully submit that what the Examiner has done here is to apply hindsight reasoning by attempting to selectively piece together teachings of each of the references in an attempt to recreate what the claimed invention discloses. Appellants also submit that if it were proper for the Examiner to combine any references to arrive at the present claims simply because each reference suggests an element of the present claims, then every invention would effectively be rendered obvious. Instead, the skilled artisan must have a reason to combine the cited references to arrive at the present claims. Appellants respectfully submit that such a reason is not present in the instant case.

The Examiner asserts that "[Appellants have] not presented any concrete reasoning or evidence to show why one skilled in the art would not have made the modification as set forth in the rejection." See, final Office Action, page 15, lines 25-27. Appellants respectfully disagree for at least the reasons set forth above. As is discussed in detail above, a showing that cited references teach away from each other rebuts a finding of obviousness. Further, the courts are clear that each reference in an obviousness rejection must be considered as a whole and those portions teaching against or away from each other and/or the claimed invention must be considered. *Bausch & Lomb, Inc. v. Barnes-Hind/Hydrocurve Inc.*, 796 F.2d 443 (Fed. Cir. 1986). Since Appellants have clearly demonstrated why the cited references teach away from each, Appellants have, in contrast to the Examiner's statement, presented reasoning to show why one skilled in the art would not have made the modification as set forth in the rejection.

In the Advisory Action, the Examiner states that "Applicant argues against cited references by stating that 'cited references, alone or in combination, fail to disclose or suggest each element of the rejected claims'" and that "Applicant[s] arrive at the above conclusion based on the statement that 'references teach away from each other and are directed towards products having completely different objectives.'" See, Advisory Action, page 2, lines 15-20. Appellants respectfully disagree, however, and submit that the last paragraph of page 4 of the Response filed July 30, 2010 is simply an introductory paragraph that introduces two arguments that are discussed separately thereafter.

For example, the introductory paragraph expressly states that "Applicants respectfully submit, however, that the cited references, alone or in combination, fail to disclose or suggest each element of the rejected claims and that the skilled artisan would have no reason to combine the cited references because the references teach away from each other and are directed toward

products having completely different objectives." See, Response filed July 30, 2010, page 4 last paragraph. Clearly, this paragraph merely sets forth two arguments: 1) that the cited references, alone or in combination, fail to disclose or suggest each element of the rejected claims; and 2) that the skilled artisan would have no reason to combine the cited references because the references teach away from each other and are directed toward products having completely different objectives. As such, Appellants respectfully submit that the Examiner has clearly misread Appellants' Response filed July 30, 2010.

Accordingly, Appellants submit that *Petricca, Igoe* and *Staackmann*, alone or in combination, fail to disclose or suggest each element of the rejected claims and are not combinable because the references teach away from each other and are directed toward products having completely different objectives.

Accordingly, Appellants respectfully request that the obviousness rejections with respect to Claims 1, 3-4, 9-11, 15 and 17 be reconsidered and the rejections be withdrawn.

D. THE REJECTION OF CLAIMS 12, 14 AND 16 UNDER 35 U.S.C. §103(a) SHOULD BE REVERSED BECAUSE THE EXAMINER HAS FAILED TO ESTABLISH A PRIMA FACIE CASE OF OBVIOUSNESS

Appellants respectfully submit that the obviousness rejection of Claims 12, 14 and 16 should be reversed because the Examiner has failed to establish a *prima facie* case of obviousness. In the final Office Action, the Examiner asserts that the combination of *Petricca, Igoe, Staackman* and *Anderson* renders the claimed subject matter obvious. See, final Office Action, pages 11-14. However, the Examiner has failed to establish a *prima facie* case of obviousness because the cited references fail to disclose each and every element of the present claims. Further, there exists no reason why the skilled artisan would have combined *Petricca, Igoe, Staackman* and *Anderson* to arrive at the presently claimed subject matter.

1. The Cited References Fail to Disclose Each and Every Element of the Present Claims

Independent Claim 12 is directed to a method of forming a milk product for providing at room temperature, either by shaking or with a foaming device, a foamed composition for beverages, the method comprising the steps of dissolving 0.3 to 3% propylene glycol monostearate (PGMS) by weight, 0.005 to 0.15% sorbitan tristearate (STS) by weight, and 0.005 to 0.015% unsaturated monoglyceride by weight in skim milk to form an emulsion; adding cream to the emulsion; adding a foam stabilizer to the emulsion; dissolving the emulsion in water to form the milk product; and high temperature processing the milk product using a process selected from the group consisting of pasteurization, sterilization, UHT treatment and combinations thereof, wherein the foam stabilizer is selected from the group consisting of a sodium alginate, a mixture of microcrystalline cellulose and carboxymethylcellulose and combinations thereof, and wherein the milk product is not cooled below room temperature to provide the foamed composition. The milk products of the present claims may be foamed by simple hand shaking, independently of the way the product is produced. The milk products do not require cooling prior to foaming, and the foam remains stable for a long time on cold and hot beverages. The products also provide a good whitening powder. See, specification, page 2, lines 5-9. In contrast, Appellants respectfully submit that the cited references are deficient with respect to the present claims.

For example, and for at least the same reasons discussed above with regard to independent Claim 1, *Petricca, Igoe* and *Staackmann* fail to disclose or suggest a milk product comprising 0.3 to 3% propylene glycol monostearate (PGMS) by weight, 0.005 to 0.15% sorbitan tristearate (STS) by weight, and 0.005 to 0.015% unsaturated monoglyceride by weight as required, in part, by independent Claim 12. Appellants submit that *Anderson* fails to remedy the deficiencies of *Petricca, Igoe* and *Staackmann*.

The Examiner relies on *Anderson* to teach the method steps adding emulsifiers to skim milk and then adding cream as a source of fat to the emulsion. See, final Office Action, page 15, line 10 to page 16, line 17. Moreover, *Anderson* teaches adding about 0.4% to about 1.0% by weight of an added monoglyceride emulsifier to the dairy product of *Anderson*. See, *Anderson*, Claim 1; column 2, lines 35-43; and column 3, lines 12-21. The monoglyceride levels taught in *Anderson* clearly exceeds the range of the present claims. Therefore, *Anderson* fails to remedy the deficiencies of *Petricca, Igoe* and *Staackmann*. As such, Appellants respectfully submit that the cited references fail to disclose or suggest each and every element of the present claims.

2. The Skilled Artisan Would Have No Reason to Combine the Cited References to Arrive at the Present Claims

Further, for reasons similar to those set forth above with respect to independent Claim 1, Appellants respectfully submit that the skilled artisan would have no reason to combine the cited references because the references teach away from each other and are directed toward products having completely different objectives. For example, *Petricca* is entirely directed to a pourable, whippable, edible emulsion containing water, fat, sweetener, protein, thickener, buffer and emulsifiers. See, *Petricca*, Abstract. As a result, *Petricca* teaches a non-dairy (non-milk) emulsion. Each example and each formulation described in *Petricca* reinforces the non-dairy nature of the emulsion. See, *Petricca*, column 2, Tables I and II, and columns 5-8, Examples 1-6. Though milk is mentioned in *Petricca*, it is only taught as a diluent for the finished product emulsion, as is discussed in detail above. Therefore, milk is not part of the emulsion invention of *Petricca*.

In contrast to *Petricca*, *Staackmann* is entirely directed to providing a dairy product having storage stability and resistance to microbiological attack at room temperature. See, *Staackmann*, column 1, lines 49-68. Similarly, *Anderson* is entirely directed to providing a shelf-stable aseptic dairy product. See, *Anderson*, Abstract. Therefore, *Petricca* teaches essentially a non-dairy food product, which not only teaches away from *Staackmann*, but also teaches away from *Anderson* and the present claims, which are directed to a milk product. As such, the skilled artisan would have no reason to combine *Petricca, Igoe, Staackmann* and *Anderson* to arrive at the present claims.

Accordingly, Appellants submit that *Petricca, Igoe, Staackmann* and *Anderson*, alone or in combination, fail to disclose or suggest each element of the rejected claims and are not combinable because the references teach away from each other and are directed toward products having completely different objectives.

Accordingly, Appellants respectfully request that the obviousness rejections with respect to Claims 12, 14 and 16 be reconsidered and the rejections be withdrawn.

VIII. CONCLUSION

Appellants respectfully submit that the Examiner has failed to establish obviousness under 35 U.S.C. §103 with respect to the present claims. Accordingly, Appellants respectfully submit that the obviousness rejections are erroneous in law and in fact and should, therefore, be reversed by this Board.

The Director is authorized to charge $540 for the Appeal Brief and any additional fees which may be required, or to credit any overpayment to Deposit Account No. 02-1818. If such a withdrawal is made, please indicate the Attorney Docket No. 3712036-00486 on the account statement.

Respectfully submitted,

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Dated: October 28, 2010

CLAIMS APPENDIX

PENDING CLAIMS ON APPEAL OF U.S. PATENT APPLICATION SERIAL NO. 10/622,115

1. A milk product for providing at room temperature, either by shaking or with a foaming device, a foamed composition for beverages, the milk product comprising 0 to 40% fat by weight, 5% to 23% non-fat solids by weight, 0.3 to 3% propylene glycol monostearate by weight, 0.005 to 0.15% sorbitan tristearate by weight, 0.005 to 0.015% unsaturated monoglyceride by weight, a foam stabilizer, and water, the milk product is not cooled below room temperature to provide the foamed composition, wherein the milk product is high temperature processed using a process selected from the group consisting of pasteurization, sterilization, UHT treatment and combinations thereof and wherein the foam stabilizer is selected from the group consisting of a sodium alginate, a mixture of microcrystalline cellulose and carboxymethylcellulose and combinations thereof.

3. The milk product of claim 1, wherein the foam stabilizer comprises 0.05% to 0.35% of microcrystalline cellulose and carboxymethylcellulose by weight.

4. The milk product of claim 1, comprising 0.05% to 0.1% sodium alginate by weight.

9. The milk product of claim 1, comprising about 25% to 40% fat by weight, sodium alginate, 2.4% to 3% propylene glycol monostearate by weight, and 0.1% to 0.15% unsaturated monoglyceride by weight.

10. The milk product of claim 1, wherein the fat is a dairy fat, a non-dairy fat, or a mixture thereof.

11. The milk product of claim 1, further comprising one or more of carbohydrates, mineral salts, colorants, or flavorings.

12. A method of forming a milk product for providing at room temperature, either by shaking or with a foaming device, a foamed composition for beverages, the method comprising:

dissolving 0.3 to 3% propylene glycol monostearate (PGMS) by weight, 0.005 to 0.15% sorbitan tristearate (STS) by weight, and 0.005 to 0.015% unsaturated monoglyceride by weight in skim milk to form an emulsion;

adding cream to the emulsion;

adding a foam stabilizer to the emulsion;

dissolving the emulsion in water to form the milk product; and

high temperature processing the milk product using a process selected from the group consisting of pasteurization, sterilization, UHT treatment and combinations thereof, wherein the foam stabilizer is selected from the group consisting of a sodium alginate, a mixture of microcrystalline cellulose and carboxymethylcellulose and combinations thereof, and wherein the milk product is not cooled below room temperature to provide the foamed composition.

15. A process for producing a foam that is stable for at least 10 minutes which comprises forming a foam from the milk product of claim 1 by shaking or by using a foaming device.

16. A process for producing a foam that is stable for at least 10 minutes which comprises forming a milk product by the method of claim 12 and forming a foam from the milk product by shaking or by using a foaming device.

17. A spray can that contains the milk product of claim 1 and is capable of dispensing the product as a stable white foam.

EVIDENCE APPENDIX

EXHIBIT A: Non-final Office Action dated October 2, 2009

EXHIBIT B: Final Office Action dated May 14, 2010

EXHIBIT C: Advisory Action dated August 19, 2010

EXHIBIT D: U.S. Patent No. 4,107,343 to Petricca ("*Petricca*")

EXHIBIT E: Dictionary of Food ingredients by Igoe et al ("*Igoe*")

EXHIBIT F: U.S. Patent No. 3,519,440 to Staackmann ("*Staackmann*")

EXHIBIT G: U.S. Patent No. 4,888,194 to Anderson et al. ("*Anderson*")

RELATED PROCEEDINGS APPENDIX

None.

EXHIBIT A

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/622,115	07/18/2003	Michel John Arthur Groux	88265-6859	1635

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EXAMINER	
CHAWLA, JYOTI	
ART UNIT	**PAPER NUMBER**
1794	

NOTIFICATION DATE	DELIVERY MODE
10/02/2009	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

chicago.patents@klgates.com

Office Action Summary	Application No.	Applicant(s)	
	10/622,115	GROUX ET AL.	
	Examiner	Art Unit	
	JYOTI CHAWLA	1794	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *06 July 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,3-12 and 14-17* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☐ Claim(s) _____ is/are rejected.

7)☒ Claim(s) *1,3-12 and 14-17* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on July 6, 2009 has been entered. Applicant has amended claims 1 and 12. Claims 1, 3-12, 14-17 are pending and examined in the application.

Claim Rejections - 35 USC § 112 (First paragraph)

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1, 3-12 and 14-17 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Amendment to latest claims 1 and 12 (received 4/21/09) once again includes the limitation "the milk product is room temperature stable for at least one month and is not cooled below room temperature to provide the foamed composition,". As claimed "the milk product is stable at room temperature for at least one month", however, applicant's disclosure (Specification Page 4, lines 19-26 and Example 2) states "On storage, the product remains stable for months without any visible sign of physical instability. It is possible with the product of the invention to reach an overrun of 5 about 300% (reached by using whipping tools) and the foam obtained remained stable for more than 2 hours at room temperature." However, the disclosure of Example 2 fails to provide specifics of storage temperature (such as, room temperature). Further, Page 2, line 33 of the disclosure states that "the product is whippable and thick at room

temperature" which also does not disclose the storage temperature of the product as claimed. Thus as claimed, the storage of product at room temperature has not been disclosed. Further, foam stability for 2 hours is not the same as product stability for at least one month, as instantly claimed. Furthermore, it is not clear as to what is included in the term "room temperature stable" as recited in the claims. Thus claims 1, 3-12 and 14-17 include subject matter that was not disclosed in a way to enable one of skill at the time of the invention to make or use the product with the recited characteristics.

Claim Rejections - 35 USC § 112 (Second paragraph)

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1, 3-12 and 14-17 rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 1, 12 and 17 are indefinite for the recitation of "the milk product is room temperature stable for at least one month and does not need to be cooled to provide the foamed composition,". It is unclear as recited as to what is meant by "room temperature stable". The term "stable" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. It is unclear whether the term "stable" refers to the stability is with reference to what property of the composition; e.g. is it stability to remain in an emulsion form at room temperature or the term "stable" refers to the physical property of the foamed product to retain its foaminess at room temperature or microbial safety of the product upon storage at room temperature or "stable" refers to the is applied to the fat content of the product which does not get oxidized upon storage at room temperature. Clarification and /or correction is required.

Claims are also indefinite for the recitation of proportions and ranges, however, as claimed it is not clear whether, these proportions are by weight or by volume. Clarification and/or correction is required.

Claim Rejections - 35 USC § 102/103

1) Rejection of claims 1, 5, 8, 10 and 11 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Jonas (US 4,012,533) made in the previous office action has been withdrawn based on applicant's amendments and remarks dated 4/21/09.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

Determining the scope and contents of the prior art.
Ascertaining the differences between the prior art and the claims at issue.
Resolving the level of ordinary skill in the pertinent art.
Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were

made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

(A) Rejection of claims 3-4, 6-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jonas in view of Gonsalves et al (U.S. 6,033,711) made in the previous office action has been withdrawn based on applicant's amendments and remarks dated 4/21/09.

(B) Rejection of claims 9 and 12-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jonas in view of Gonsalves further in view of Lynch (U.S. 5,759,609) made in the previous office action has been withdrawn based on applicant's amendments and remarks dated 4/21/09.

(C) Rejection of claims 15-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jonas in view of Gonsalves further in view of the combination of Lynch (U.S. 5,759,609) and Thompson (U.S. 3,230,091) made in the previous office action has been withdrawn based on applicant's amendments and remarks dated 4/21/09.

(D) Rejection of claims 1, 3-8, 10-11, 15 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Staackmann (US 3,519,440) in view of Gonsalves (U.S. 6,033,711) made in the previous office action has been withdrawn based on applicant's amendments and remarks dated 4/21/09.

(E) Claims 1, 3-5, 7, 10-11, 15 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Petricca (US 4107343) in view of Staackmann (US 3,519,440).

Milk products with varying amount of fats, proteins and emulsifiers and stabilizers were that were stable at room temperature were known at the time of the invention. Regarding claim 1, Petricca teaches of a milk product comprising 20-30% fat (claimed range 0-40%), 0.5 to 2.5 and up to 4% dispersible protein i.e., sodium caseinate, which is a non-fat solid and sucrose 7-20% (see column 1, lines 40-45), which are both non-fat solids and their amount falls in the claimed range 5-23% (Also see Petricca tables I and II), 0.75-2.5% emulsifiers. Petricca discloses of microcrystalline cellulose and carboxymethyl cellulose combination as thickener (i.e., a stabilizer) (Column 1, lines 57-59). Regarding water Petricca discloses 45-60% water (Column 1, lines 42-44) as instantly claimed.

Regarding the limitation that the milk product is room temperature stable for at least one month and does not need to be cooled prior to providing the foamed composition Petricca discloses "such emulsion being substantially stable against separation and/or gelation for at least about 1 year at room temperature under aseptic conditions and whippable in the temperature range of 40° to 100° F. to at least about 200% overrun" (Column 1, lines 52-56). Petricca further teaches that the product can be whipped at 70° F (See Column 6, lines 38-50, especially lines 44 and 50), which includes the recited limitations of claim 1.

Regarding the limitation of high temperature processing as recited in claim 1, it is noted that it is a process limitation and "Even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process." In re Thorpe, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985). In the instant case it is noted that high temperature processing of milk products was well known. Petricca teaches of sterilization (Petricca Column 2, lines 55-60).

Regarding the limitation of emulsifiers as recited in claims 1 and 7, Petricca discloses that "emulsifiers consisting essentially of a major proportion of Propylene Glycol Monostearate or hexaglycerol distearate...and minor proportion of a combination of ethoxylated sorbitan ester..., sorbitan monostearate... and lecithin" (Column 1, lines 40-63), which includes Propylene Glycol Monostearate and sorbitan monostearate which is a monoglyceride (i.e., Petricca teaches at least two emulsifiers as claimed). Petricca also teaches of fatty acid esters of sorbitan (such as, sorbitan monostearate in the range of 0.05 to 0.5% (Column 2, Table I and II), mono and diglycerides (See column 3, lines 59 to Column 4, line 12). Thus Petricca teaches of monoglycerides, however, unsaturated monoglycerides and their amount in the composition emulsifiers as claimed, is not disclosed. However, Regarding the selection of emulsifiers Staackmann discloses from the group consisting of propylene glycol monostearate (Column 3, lines 48-68), and fatty acid glycerides obtained from various fatty acids including unsaturated fatty acids, such as oleic, palmitoleic, myristooleic etc (See Staackmann Column 3, lines 3-12, 30-35 and 48-68) i.e., unsaturated monoglycerides and combinations thereof in the amount of 0.1% (Column 5, composition A), which falls within 0.005% to 0.15% unsaturated monoglyceride as recited., as claimed. Thus, at least two emulsifiers including monoglycerides of unsaturated fatty acids, from applicant's recited list of emulsifiers and combinations thereof were known to be added to whippable or whipped milk compositions (Staackmann and Jonas), in order to emulsify the fat in the emulsion. Since Petricca and Staackmann both make stable emulsions, as claimed, it would be obvious that the emulsifiers function similarly, i.e., would be regarded as functional equivalents. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute one art recognized functional equivalent (i.e., ethoxylated sorbitan ester..., sorbitan monostearate... and lecithin (emulsifiers)) for another (i.e., monoglyceride of unsaturated fatty acid) in the milk product as disclosed by Petricca, depending on which emulsifying agents were more available and affordable at the time the invention was made. The Courts have held that the selection of a known material, which is based upon its suitability for the intended use, is within the

ambit of one of ordinary skill in the art. See *In re Leshin*, 125 USPQ 416 (CCPA 1960) (see MPEP § 2144.07).

Regarding claim 3, Petricca teaches of stabilizers or thickeners and discloses "It is preferred that the thickener be a major proportion of microcrystalline cellulose and a minor amount of carboxymethyl cellulose" (Column 1, lines 57-59). Regarding the amount of thickener or stabilizer, Petricca discloses 0.1 to 0.75% thickener (Column 1, lines 43-45), which falls in the recited range of the applicant.

Regarding claim 4, Petricca teaches of microcrystalline cellulose and carboxymethyl cellulose combination as thickener (i.e., a stabilizer) (Column 1, lines 57-59). Petricca discloses the use of hydrocolloids in the milk composition, including guar, gum arabic, locust bean, acacia, tragacanth, carrageenan, xanthan, ghatti, agar and karaya (See Column 3, lines 10-15), but the reference is silent about adding algin or sodium salt of algin as a stabilizer in the milk composition. However, sodium alginate is well known in the art as a thickening agent/ stabilizer for emulsions and works in a manner that is similar to the hydrocolloids disclosed by Petricca. For example, Staackmann teaches a milk product comprising sodium alginate (algin) (Column 4, lines 28-34) in the recited range of 0.05% to 0.1%. Thus, addition of alginate in the recited amount in emulsion type milk products was known at the time of the invention for the purpose of stabilizing the emulsion. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute one art recognized functional equivalent (i.e., gums and hydrocolloids of Petricca) for another (i.e., alginate) in the milk product as disclosed by Petricca, depending on which stabilizing agents were more available and affordable at the time the invention was made. The Courts have held that the selection of a known material, which is based upon its suitability for the intended use, is within the ambit of one of ordinary skill in the art. See *In re Leshin*, 125 USPQ 416 (CCPA 1960) (see MPEP § 2144.07).

Regarding claim 5, Petricca teaches a milk product of claim 1, comprising 0.25 to 2.5% propylene glycol monostearate (Column 2, lines 35-40, TABLE II).

Regarding claim 10, Petricca teaches that the fat is vegetable or animal origin (which would include dairy fat) (See Petricca Column 3, lines 1-6), as claimed. Staackmann also teaches that fats can be dairy or non-dairy fats, or a mixture thereof (Column 2, lines 47-65).

Regarding claim 11, Petricca teaches sucrose, which is a carbohydrate (See Column 2, Table I), as claimed. Further, Staackmann teaches a milk product of claim 1, further comprising one or more of carbohydrates , i.e., starches (column 4, lines 23-25), mineral salts, colorants, or flavorings (Column 3, lines 1-15 and Columns 5-6 Compositions A-D), as recited.

Regarding claim 15, Petricca teaches of a foam that is stable for at least 10 minutes after foaming using a foaming device (See Column 7, where no significant air coalescence is observed for 4-8 hours, which includes applicant's recited time. Further, Staackmann teaches a process for producing a foam that is stable for at least 10 minutes which comprises forming a milk product by the method of claim 12 and forming a foam from the milk product by shaking or by using a foaming device (Column 1, line 68 to Column 2, line 24).

Regarding claim 17, Petricca does not teach dispensing from an aerosol can , however, Staackmann teaches a spray can (i.e., aerosol container) that contains the milk product of claim 1 and is capable of dispensing the product as a stable white foam (Column 1, lines 68-72 and Column 2, lines 7-10). Aerosol cans were known to be used for dispersal of whipped products at the time of the invention. Therefore, it would have been a matter of routine determination for one of ordinary skill in the art at the time of

the invention to modify Petricca in view of Staackmann further and utilize the foaming device as taught by Staackmann in order to dispense a foamy milk product as instantly claimed. One of ordinary skill would have been motivated to do so at least for the purpose of creating a readily dispersible milk product for convenience to the consumer.

(F) Claims 6, 8 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Petricca (US 4107343) in view of Staackmann (US 3,519,440) further in view of Gilmore et al (US 4199608), hereinafter Gilmore.

Petricca in view of Staackmann has been applied to claims 1 and 7 above.

Regarding claim 6, Petricca in view of Staackmann teaches milk product as recited in claim 1. Petricca discloses that "emulsifiers consisting essentially of a major proportion of Propylene Glycol Monostearate or hexaglycerol distearate...and minor proportion of a combination of ethoxylated sorbitan ester..., sorbitan monostearate... and lecithin" (Column 1, lines 40-63), which includes Propylene Glycol Monostearate and sorbitan monostearate which is a monoglyceride (i.e., Petricca teaches at least two emulsifiers as claimed). Petricca also teaches of fatty acid esters of sorbitan, such as, sorbitan monostearate in the range of 0.05 to 0.5% and Polysorbate 80 (i.e., polyethoxylated sorbitan monooleate) in an amount 0.01 to 0.1%, (see Column 2, Table I and II), which includes the recited range of the applicant in terms of sorbitan ester's amount. Petricca is silent regarding sorbitan esters including sorbitan tristearate (also known as Polysorbate 65 or Polyethoxylated sorbitan tristearate). However, food products, such as creamers, coffee whiteners and whippable toppings etc., which utilize fatty acid esters of sorbitan, including polyoxyethylene sorbitan tristearate (i.e., sorbitan tristearate or Polysorbate 65) and polyoxyethylene sorbitan monooleate Polysorbate 80, as emulsifiers, were known in the art at the time of the invention, e.g., Gilmore (see Column 1, lines 9-35 and Column 5, lines 18-26). Regarding the specific amount of such sorbitol esters, Gilmore also discloses that sorbitan esters emulsifiers are employed in a very small amount (Gilmore, Column 5, lines 27-29). Further, Gilmore

discloses an exemplary addition of 0.03% of Polysorbate 80 (an emulsifier in the same category as sorbitan tristearate) in a composition (see Gilmore, Column 8, Example 2, lines 20-23), which falls in applicants' recited range of the applicant. Thus, fatty acid esters of sorbitan including sorbitan monostearate, sorbitan tristearate (Polysorbate 65) and sorbitan monooleate (Polysorbate 80) were known and utilized in whipped or whippable composition in recited amounts at the time of the invention, as taught by Petricca and Gilmore. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute one art recognized functional equivalent (i.e., sorbitan monostearate or sorbitan monooleate of Petricca) for another (i.e., sorbitan tristearate of Gilmore) in the milk product as disclosed by Petricca, at least depending on which ester of sorbitan was more effective as an emulsifier, more affordable and more easily available at the time the invention was made. The Courts have held that the selection of a known material, which is based upon its suitability for the intended use, is within the ambit of one of ordinary skill in the art. See *In re Leshin*, 125 USPQ 416 (CCPA 1960) (see MPEP § 2144.07).

Regarding claims 6, 8 and 9 Petricca in view of Staackmann teaches a milk product comprising Petricca teaches of a milk product comprising 20-30% fat (claimed range 0-25% for claim 8 and 25-40% for claim 9), 0.25% to 02.5% propylene glycol monostearate (Column 2, Tables I and II) which falls in the ranges for both claims 8 and 9, 0.1% unsaturated monoglyceride (In view of Staackmann as discussed regarding claim 7 above, which falls in the range for claim 9) with microcrystalline cellulose and carboxymethyl cellulose combination as thickener (i.e., a stabilizer) (Column 1, lines 57-59). Regarding water Petricca discloses 45-60% water (Column 1, lines 42-44) as instantly claimed.
Regarding sorbitan tristearate, Petricca in view of Gilmore teaches the recited range, as discussed in claim 6 above.
Regarding the unsaturated monoglyceride range recited in claim 8, Petricca in view of Staackmann teaches 0.1% unsaturated monoglyceride which is more than instantly

claimed amount of 0.005% to 0.015%. However, it was known to modify the relative proportion of emulsifiers in the whippable or foamable compositions, e.g., Petricca discloses various ranges for various emulsifiers that are employed, e.g., the amount of Polysorbate 80, which is also a sorbitan ester varies from 0.01 to 0.1% (See Petricca Column 2, Tables I and II. Furthermore amount of lecithin ranges from 0-0.15% (See Tables I and II) Therefore, to modify one of the emulsifier amounts when more than one emulsifier is employed would have been a matter of routine determination for one of ordinary skill in the art at the time of the invention at least based on the cost, availability, storability and desired characteristics of the emulsifier. One of ordinary skill would have been further motivated to modify or adjust the amount of one of the emulsifiers in order to obtain a combination of emulsifiers that extend the storage life of the milk based composition.

(G) Claims 12, 14 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Petricca (US 4107343) in view of the combination of Staackmann (US 3,519,440), and Gilmore (US 4199608), further in view of Anderson et al (US 4888194), hereinafter Anderson.

Regarding claim 12, Petricca teaches of a method of making a sterilized and homogenized whippable emulsion comprising adding stabilizers, sweeteners, protein and milk components and flavors, emulsifiers and fats as claimed.

Regarding the limitation of specific emulsifiers as recited in claims 12, Petricca discloses that "emulsifiers consisting essentially of a major proportion of Propylene Glycol Monostearate, ethoxylated sorbitan ester, sorbitan monostearate" (Column 1, lines 40-63), which includes Propylene Glycol Monostearate as recited. Petricca also teaches of fatty acid esters of sorbitan (such as, sorbitan monostearate in the range of 0.05 to 0.5% (Column 2, Table I and II), mono and diglycerides (See column 3, lines 59 to Column 4, line 12). Thus, Petricca teaches of a combination of emulsifiers which includes Propylene Glycol Monostearate, monoglycerides, sorbitan esters.

Petricca however is silent as to the monosaccharides being unsaturated monoglycerides and their amount in the composition emulsifiers as claimed, is not disclosed. Staackmann discloses whippable milk products with emulsifiers added from the group consisting of propylene glycol monostearate (Column 3, lines 48-68), and fatty acid glycerides obtained from various fatty acids including unsaturated fatty acids, such as oleic, palmitoleic, myristooleic etc (See Staackmann Column 3, lines 3-12, 30-35 and 48-68) i.e., unsaturated monoglycerides and combinations thereof in the amount of 0.1% (Column 5, composition A), which falls within 0.005% to 0.15% unsaturated monoglyceride as recited., as claimed. Thus, emulsifiers including monoglycerides of unsaturated fatty acids, from applicant's recited list of emulsifiers and combinations thereof were known to be added to whippable or whipped milk compositions (Staackmann and Petricca), in order to emulsify the fat in the emulsion. Since Petricca and Staackmann both make stable emulsions, as claimed, it would be obvious that the emulsifiers function similarly, i.e., would be regarded as functional equivalents. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute one art recognized functional equivalent (i.e., ethoxylated sorbitan ester..., sorbitan monostearate... and lecithin (emulsifiers)) for another (i.e., monoglyceride of unsaturated fatty acid) in the milk product as disclosed by Petricca, depending on which emulsifying agents were more available and affordable at the time the invention was made. The Courts have held that the selection of a known material, which is based upon its suitability for the intended use, is within the ambit of one of ordinary skill in the art. See *In re Leshin*, 125 USPQ 416 (CCPA 1960) (see MPEP § 2144.07).

Petricca is also silent about specific sorbitan esters that can be added to the milk composition as emulsifiers. Petricca is specifically silent whether the sorbitan ester includes sorbitan tristearate (also known as Polysorbate 65 or Polyethoxylated sorbitan tristearate). However, food products, such as creamers, coffee whiteners and whippable toppings etc., which utilize fatty acid esters of sorbitan, including polyoxyethylene sorbitan tristearate (i.e., sorbitan tristearate or Polysorbate 65) and polyoxyethylene sorbitan monooleate Polysorbate 80, as emulsifiers, were known in the art at the time of

the invention, e.g., Gilmore (see Column 1, lines 9-35 and Column 5, lines 18-26). Regarding the specific amount of such sorbitol esters, Gilmore also discloses that sorbitan esters emulsifiers are employed in a very small amount (Gilmore, Column 5, lines 27-29). Further, Gilmore discloses an exemplary addition of 0.03% of Polysorbate 80 (an emulsifier in the same category as sorbitan tristearate) in a composition (see Gilmore, Column 8, Example 2, lines 20-23), which falls in applicants' recited range of the applicant. Thus, fatty acid esters of sorbitan including sorbitan monostearate, sorbitan tristearate (Polysorbate 65) and sorbitan monooleate (Polysorbate 80) were known and utilized in whipped or whippable composition in recited amounts at the time of the invention, as taught by Petricca and Gilmore. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute one art recognized functional equivalent (i.e., sorbitan ester of Petricca) for a specific sorbitan ester (i.e., sorbitan tristearate of Gilmore) in the milk product as disclosed by Petricca, at least depending on which ester of sorbitan was more effective as an emulsifier, more affordable and more easily available at the time the invention was made. The Courts have held that the selection of a known material, which is based upon its suitability for the intended use, is within the ambit of one of ordinary skill in the art. See *In re Leshin*, 125 USPQ 416 (CCPA 1960) (see MPEP § 2144.07).

Regarding the limitation that the milk product is room temperature stable for at least one month and does not need to be cooled prior to providing the foamed composition Petricca discloses "such emulsion being substantially stable against separation and/or gelation for at least about 1 year at room temperature under aseptic conditions and whippable in the temperature range of 40° to 100° F. to at least about 200% overrun" (Column 1, lines 52-56). Petricca further teaches that the product can be whipped at 70° F (See Column 6, lines 38-50, especially lines 44 and 50), which includes the recited limitations of claim 12.

Regarding the process of making a whippable milk product of claim 12, Petricca teaches a method of making a whippable emulsion comprising adding stabilizers,

sweeteners, protein and milk components and flavors and water etc., to which the emulsifiers are added and then fats are added. Thereafter the mixture is agitated and sterilized and cooled and aseptically homogenized (See Petricca Column 2, lines 45-64). Regarding the limitation of high temperature processing Petricca teaches of sterilization (Petricca Column 2, lines 55-60), as claimed. Thus, Petricca teaches the addition of fats after the addition of emulsifiers as instantly claimed. Regarding the order of steps applicants' are referred to MPEP 2144.04 [R-1] IV where it is stated that selection of any order of performing process steps is prima facie obvious in the absence of new or unexpected results.

Petricca is silent about the limitations of adding the emulsifiers to skim milk and then adding cream as a source of fat to the to the emulsion (lines 4-7 of claim 12 as recited). However, utilizing various dairy products, such as skim milk and cream in making a milk product was known at the time of the invention. Also addition of emulsifiers, additives and dry ingredients to a dairy product and forming an emulsion before adding more dairy product was also known at the time of the invention. For example, Anderson teaches a process of making a shelf stable aseptic dairy product which is capable of forming stable foam upon whipping (See Anderson, Column 2, lines 35-40). Anderson's dairy composition may include dairy cream "in combination with whole or skim milk or milk solids in any proportions such that the desired butterfat content results" (Anderson, Column 3, lines 33-36). Regarding the process of making a whippable dairy product, Anderson also teaches that emulsifier is added to a portion of the cream (or dairy ingredient, such as skim milk) along with other ingredients and mixed and heated to ensure that the dry blend is completely dissolved. The mixture is then added to the remaining portion of cream and other additives added at this time with thorough mixing. The mixture is cooled and after cooling, the mixture is subjected to UHT processing (See Anderson, Column 6, lines 21-45 and lines 46-68).
Thus, process steps as recited in claim 12, including adding fats after the addition of emulsifiers in a process of making a room temperature stable whippable milk product was known in the art at the time of the invention (Petricca, Column 2, lines 45-65 and column 4, lines 45-50). Also the process of making a whippable dairy product where a

combination of dairy ingredients (skim milk, milk, milk solids and cream) are used to achieve a desired fat content was known at the time of the invention (Anderson). Moreover, process steps for making a whippable dairy product where emulsifiers are added to a part of dairy product to form an emulsion before adding the entire dairy component to the emulsion was well known in the art at the time of the invention (As taught by Anderson). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Petricca and utilize a dairy ingredient, such as skim milk to mix with emulsifiers and other dry ingredients and blend to form an emulsion before adding the dairy based fat ingredient, such as cream as taught by Anderson in the process of making a stable whippable milk product. One of ordinary skill in the art would have been motivated to modify Petricca and include one or more milk based ingredients, such as skim milk, milk, milk solids and cream in any proportions, at least for the purpose of achieving a desired fat content in the whippable milk product (Anderson, Column 3, lines 33-36). Further it is noted that new recipes for food involving the addition of common ingredients do not amount to invention merely because the coaction or cooperative relationship between the ingredients which produces new, unexpected, and useful function. In re Levin, 84 USPQ 232.

Regarding claim 14, Petricca discloses that it is preferred that the thickener (i.e., a stabilizer) comprises of microcrystalline cellulose and carboxymethyl cellulose (Column 1, lines 57-59), as instantly claimed.

Regarding claim 16, Petricca teaches of foam that is stable for at least 10 minutes after foaming using a foaming device (See Column 7, where no significant air coalescence is observed for 4-8 hours, which includes applicant's recited time. Further, Staackmann teaches a process for producing foam that is stable for at least 10 minutes which comprises forming a milk product by the method of claim 12 and forming foam from the milk product by shaking or by using a foaming device (Column 1, line 68 to Column 2, line 24).

Response to Arguments

Applicant's arguments with respect to amended claims 1, 3-12 and 14-17 have been considered but are moot in view of the new ground(s) of rejection.
Claims 1, 3-12 and 14-17 are rejected for reasons of record.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jyoti Chawla whose telephone number is (571) 272-8212. The examiner can normally be reached on 8:00 am to 4:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Keith Hendricks can be reached on (571) 272-1401. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Jyoti Chawla
Examiner
Art Unit 1794

/KEITH D. HENDRICKS/
Supervisory Patent
Examiner, Art Unit 1794

Notice of References Cited	Application/Control No. 10/622,115	Applicant(s)/Patent Under Reexamination GROUX ET AL.	
	Examiner JYOTI CHAWLA	Art Unit 1794	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-4,107,343	08-1978	Petricca, Anthony V.	426/564
*	B	US-4,199,608	04-1980	Gilmore et al.	426/570
*	C	US-4,888,194	12-1989	Andersen et al.	426/570
	D	US-			
	E	US-			
	F	US-			
	G	US-			
	H	US-			
	I	US-			
	J	US-			
	K	US-			
	L	US-			
	M	US-			

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

EXHIBIT B

UNITED STATES PATENT AND TRADEMARK OFFICE

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/622,115	07/18/2003	**Michel John Arthur Groux**	3712036-00486	1635

29157 7590 05/14/2010

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EXAMINER	
CHAWLA, JYOTI	
ART UNIT	**PAPER NUMBER**
1781	

NOTIFICATION DATE	DELIVERY MODE
05/14/2010	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

chicago.patents@klgates.com

Office Action Summary	Application No.	Applicant(s)	
	10/622,115	GROUX ET AL.	
	Examiner	Art Unit	
	JYOTI CHAWLA	1781	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *02 February 2010*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,3-4, 9-12 and 14-17* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,3,4,9-12 and 14-17* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Applicant's submission filed on February 2, 2010 has been entered. Applicant has amended claims 1 and 12 and cancelled claims 5-8. Claims 1, 3-4, 9-12 and 14-17 remain pending and are examined in the application.

Claim Objections

Claim 9 is objected to because of the following informalities: claim recites the proportions without qualifying that the proportions are determined "by weight", as indicated in the independent claim 1. Appropriate correction is required.

Claim 14 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. In the instant case the limitations recited in dependent claim 14 are already part of the parent claim 12. Appropriate correction is required.

Claim Rejections - 35 USC § 112 (First paragraph)

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.
Rejection of claims 1, 3-12 and 14-17 under 35 U.S.C. 112, first paragraph, for failing to comply with the enablement requirement "the milk product is room temperature stable for at least one month and does not need to be cooled to provide the foamed composition," has been withdrawn based on applicant's amendment to latest claims 1 and 12 (received 2/2/2010).

Claim Rejections - 35 USC § 112 (Second paragraph)

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Rejection of claims 1, 3-12 and 14-17 under 35 U.S.C. 112, second paragraph, for being indefinite for failing to particularly point out and distinctly claim the subject matter have been withdrawn based on applicant's amendment to latest claims 1 and 12 (received 2/2/2010).

Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

(A) Claims 1, 3-4, 9-11, 15 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Petricca (US 4107343) in view of the combination of Dictionary of Food ingredients by Igoe et al, hereinafter, Dictionary of Food Ingredients, and Staackmann et al (US 3,519,440), hereinafter Staackmann.

Regarding claim 1, Petricca teaches a product, which may be a milk product (Column 4, lines 61-63) which is "whippable homogenized emulsion comprising water fat sweetener, dispersible protein, thickener, buffer and emulsifier" (Column 1, lines 30-34). Whippable product of Petricca comprises about 20-30% fat by weight (see Column 1,

lines 41-43), which falls in the claimed range of 0 to 40% fat by weight. Regarding the limitation of 5% to 23% non-fat solids by weight, Petricca teaches of 0.5 to 2.5 and up to 4% dispersible protein i.e., sodium caseinate, which is a non-fat solid and sucrose 7-20% (see column 1, lines 40-45) which are both non-fat solids and their amount falls in the claimed range 5-23% (Also see Petricca tables I and II). Petricca teaches of including 0.1 to 0.75% by weight of thickeners (i.e., stabilizers), such as, microcrystalline cellulose and carboxymethyl cellulose combination (Column 1, lines 44, 56-59 and Column 3, lines 5-15). Regarding water Petricca discloses 45-60% water (Column 1, lines 42-44) as instantly claimed.
Petricca discloses of 0.75-2.5% emulsifiers (for example see Petricca Column 1, lines 44-46). Regarding specific emulsifiers Petricca discloses a whippable composition comprising 0.25 to 2.5% propylene glycol monostearate (Column 2, lines 35-40, TABLE II), which falls in the recited range 0.3 to 3% propylene glycol monostearate by weight for claim 1. Petricca also includes minor amounts of other emulsifiers including ethoxylated sorbitan esters (a class of emulsifiers known as polysorbates, such as, polysorbate 60 and polysorbate 80) and fatty acid esters of sorbitan (a class of esters which includes sorbitan monostearate, sorbitan tristearate etc), and provides specific amounts for a fatty sorbitan monostearate in 0.05 to 0.25 % by weight (see e.g., Column 1, lines 49-52 and Column 3, lines 59-60). Petricca also discloses that emulsifying composition having fatty acid moiety in polyglycerol ester can be "one or more even numbered C_{12-22} saturated or unsaturated monocarboxylic acid" (see Column 3, lines30-35) and that "mono and diglycerides may also be utilized in an attempt to reduce whipping time for the emulsion without affecting the stability" (Column 3, lines 63-66).

i) Regarding the limitations of "providing at room temperature, either by shaking or with a foaming device, a foamed composition" and "the milk product is not cooled below room temperature to provide the foamed composition", as recited in amended claim 1, Petricca discloses "such emulsion being substantially stable against separation and/or gelation for at least about 1 year at room temperature under aseptic conditions and

whippable in the temperature range of 40° to 100° F. to at least about 200% overrun" (Column 1, lines 52-56). Petricca further teaches that the product can be whipped at 70° F (See Column 6, lines 38-50, especially lines 44 and 50), which includes the recited limitations of claim 1.

ii) Regarding the limitation of "a foamed composition for beverages" limitation is an intended use of the composition and the intended use does not determine the patentability of the composition. Thus, the limitation is not positively claimed. However, even if the limitation is positively claimed, it would not have defined over the prior art as Petricca teaches of "pourable edible whippable homogenized emulsion comprising water fat sweetener, dispersible protein, thickener, buffer and emulsifier" (Column 1, lines 30-34) "for food topping" (Column 1, lines 14-15). Furthermore, whipped toppings are well known in the beverage industry with beverages such as hot chocolates. In addition, Petricca discloses similar components and it would have been obvious to one of ordinary skill in the art that whippable composition as disclosed by Petricca will function as a beverage foaming milk product as claimed.

iii) Regarding the limitation of high temperature processing as recited in claim 1, it is noted that it is a process limitation and "Even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process." In re Thorpe, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985). In the instant case it is noted that high temperature processing of milk products was well known. Petricca teaches of sterilization (Petricca Column 2, lines 55-60 and Column 4, lines 28-31).

iv) Regarding the limitation of emulsifiers including 0.005 to 0.15% sorbitan tristearate by weight, as recited in claim 1, Petricca teaches of including propylene

glycol monostearate in the claimed range of the applicant (Column 2, lines 35-40, TABLE II) as discussed above. Petricca also teaches of minor amounts of other emulsifiers including ethoxylated sorbitan esters (a class of emulsifiers known as polysorbates, such as, polysorbate 60 and polysorbate 80) and fatty acid esters of sorbitan (a class of esters which includes sorbitan monostearate, sorbitan tristearate etc), and provides specific amounts for a fatty sorbitan monostearate in 0.05 to 0.25 % by weight (Column 1, lines 49-52 and Column 3, lines 59-60). However, Petricca does not specifically teach that fatty acid ester of sorbitan is sorbitan tristearate and is added to whippable composition in an amount of 0.005 to 0.15% by weight of the composition. However, food products, such as creamers, coffee whiteners and whippable toppings etc., which utilize fatty acid esters of sorbitan, including polyoxyethylene sorbitan tristearate (i.e., sorbitan tristearate and by trade names of Polysorbate 65 and Span 65) and polyoxyethylene sorbitan monooleate Polysorbate 80, as emulsifiers, were known in the art at the time of the invention. Sorbitan tristearate is a non-ionic surfactant (emulsifier) which is dispersible in fat, oil and water and was known in the art of food at the time of the invention as disclosed by Dictionary of Food Ingredients, page 111. Regarding the specific use and amount of sorbitan tristearate, Dictionary of food ingredients discloses that sorbitan tristearate is added to foods, such as, frozen desserts, cakes and coffee whiteners; frequently used with sorbitan monostearate or mono and diglycerides (other emulsifiers) typically in amounts 0.1 to 0.4%, which includes applicants' recited amount of 0.005 to 0.15% by weight. Thus, one of ordinary skill in the art had knowledge of the following

- fatty acid esters of sorbitan such as sorbitan monostearate and mono and diglycerides were known to be added to whippable or whipped milk compositions as emulsifiers in amounts that fall in the recited range of the applicant (Petricca, Column 1, lines 49-52 and Column 3, lines 59-65), in order to achieve optimal emulsification of fat in the whippable composition while reducing the whipping time.
- Petricca makes stable emulsion as claimed, and non-ionic emulsifying compound disclosed by Petricca (sorbitan monostearate) can be added amounts in

applicants' recited range along with propylene glycol monostearate and other emulsifiers (Petricca Column 3) to obtain a stable emulsion that can be stored and be foamed at room temperature as recited in claims.

- Sorbitan tristearate is a fatty acid ester of sorbitan, which is a non-ionic surfactant which is dispersible in fat, oil and water and is added to beverage whiteners in 0.1 to 0.4% frequently in combinations with other emulsifiers (Dictionary of Food ingredients, page 111).

Further it is noted that compounds sorbitan monostearate (Petricca) and sorbitan tristearate (Dictionary of Food Ingredients) are both fatty acid esters of sorbitan that are safe to use in foods and are both are non-ionic surfactants or emulsifiers having the recommended usage amount in the claimed range of the applicant. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention that sorbitan monostearate (Petricca) and sorbitan tristearate (Dictionary of Food Ingredients) will function similarly when added to a whippable composition, i.e., would be regarded as functional equivalents. Therefore, it would have been matter of routine determination for one of ordinary skill in the art at the time the invention was made to modify Petricca in view of Dictionary of Food Ingredients and substitute art recognized functional equivalent of a fatty acid ester of sorbitan (i.e., sorbitan monostearate) for another (i.e., sorbitan tristearate) in the whippable product as disclosed by Petricca at least based on which ester of sorbitan was more effective as an emulsifier, more affordable and more easily available at the time the invention was made. The Courts have held that the selection of a known material, which is based upon its suitability for the intended use, is within the ambit of one of ordinary skill in the art. See *In re Leshin*, 125 USPQ 416 (CCPA 1960) (see MPEP § 2144.07).

v) Petricca discloses that emulsifying composition having fatty acid moiety in polyglycerol ester can be "one or more even numbered C_{12-22} saturated or unsaturated monocarboxylic acid" (see Column 3, lines30-35) and that "mono and diglycerides may also be utilized in an attempt to reduce whipping time for the emulsion without affecting

the stability" (Column 3, lines 63-66). However, Petricca does not specifically teach that the monoglycerides are unsaturated monoglyceride in the amount of 0.005 to 0.15% by weight of the composition, as recited in the independent claims 1. However, Regarding the selection of emulsifiers Staackmann discloses from the group consisting of propylene glycol monostearate (Column 3, lines 48-68), and fatty acid glycerides obtained from various fatty acids including unsaturated fatty acids, such as oleic, palmitoleic, myristooleic etc (See Staackmann Column 3, lines 3-12, 30-35 and 48-68) i.e., unsaturated monoglycerides and combinations thereof in the amount of 0.1% (Column 5, composition A), which falls within 0.005% to 0.15% unsaturated monoglyceride as recited. Thus, one of ordinary skill in the art had knowledge of the following

- monoglycerides of fatty acids, were known to be added to whippable or whipped compositions to reduce the whipping time without affecting the stability (Petricca, Column 3, lines 63-65)
- fatty acids known to be added to whippable or whipped milk compositions as emulsifiers can be saturated or unsaturated fatty acids (Staackmann, Column 3, lines 48-68), in order to achieve optimal emulsification of fat in the whippable milk composition.

Since Petricca and Staackmann both make stable emulsions, as claimed, it would be obvious that the emulsifiers function similarly, i.e., would be regarded as functional equivalents. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Petricca in view of Staackmann and substitute one art recognized functional equivalent (i.e., monoglyceride of fatty acid) for another (i.e., monoglyceride of unsaturated fatty acid) in the whippable product as disclosed by Petricca at least based on which emulsifying agents were more easily available and affordable at the time the invention was made. The Courts have held that the selection of a known material, which is based upon its suitability for the intended use, is within the ambit of one of ordinary skill in the art. See *In re Leshin*, 125 USPQ 416 (CCPA 1960) (see MPEP § 2144.07).

Regarding claim 3, Petricca teaches of stabilizers or thickeners and discloses "It is preferred that the thickener be a major proportion of microcrystalline cellulose and a minor amount of carboxymethyl cellulose" (Column 1, lines 57-59). Regarding the amount of thickener or stabilizer, Petricca discloses 0.1 to 0.75% thickener (Column 1, lines 43-45), which falls in the recited range of the applicant.

Regarding claim 4, Petricca teaches of microcrystalline cellulose and carboxymethyl cellulose combination as thickener (i.e., a stabilizer) (Column 1, lines 57-59). Petricca discloses the use of hydrocolloids in the milk composition, including guar, gum arabic, locust bean, acacia, tragacanth, carrageenan, xanthan, ghatti, agar and karaya (See Column 3, lines 10-15), but the reference is silent about adding algin or sodium salt of algin as a stabilizer in the milk composition. However, sodium alginate is well known in the art as a thickening agent/ stabilizer for emulsions and works in a manner that is similar to the hydrocolloids disclosed by Petricca. For example, Staackmann teaches a milk product comprising sodium alginate (algin) (Column 4, lines 28-34) in the recited range of 0.05% to 0.1%. Thus, addition of alginate in the recited amount in emulsion type milk products was known at the time of the invention for the purpose of stabilizing the emulsion. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute one art recognized functional equivalent (i.e., gums and hydrocolloids of Petricca) for another (i.e., sodium alginate) in the milk product as disclosed by Petricca, depending on which stabilizing agents were more available and affordable at the time the invention was made. The Courts have held that the selection of a known material, which is based upon its suitability for the intended use, is within the ambit of one of ordinary skill in the art. See *In re Leshin*, 125 USPQ 416 (CCPA 1960) (see MPEP § 2144.07).

Regarding claim 9, Petricca teaches a whippable product comprising about 20-30% fat by weight (see Column 1, lines 41-43), which falls in the claimed range of 25% to 40% fat by weight. Petricca discloses a whippable composition comprising 0.25 to 2.5% propylene glycol monostearate (Column 2, lines 35-40, TABLE II), which falls in the

recited range of 2.4 to 3% propylene glycol monostearate by weight for claim 9. The limitations of 0.1 to 0.15% by weight of unsaturated monoglyceride and sodium alginate as recited in claim 9 have already been discussed as part of claim 1(see point (v) above) and claim 4 respectively. Thus claim 9 is rejected for the same reasons as discussed above regarding claims 1 and 4.

Regarding claim 10, Petricca teaches that the fat is vegetable or animal origin and includes examples of vegetable and animal fats (See Petricca Column 3, lines 1-6), which include the limitation of fats as claimed. Staackmann also teaches that fats can be dairy or non-dairy fats, or a mixture thereof (Column 2, lines 47-65).

Regarding claim 11, Petricca teaches sucrose, which is a carbohydrate (See Column 2, Table I), as claimed. For colors and flavors see examples and details in Column 3-4 of Petricca). Further, Staackmann teaches a milk product of claim 1, further comprising one or more of carbohydrates , i.e., starches (column 4, lines 23-25), mineral salts, colorants, or flavorings (Column 3, lines 1-15 and Columns 5-6 Compositions A-D), as recited.

Regarding claim 15, Petricca teaches of a foam that is stable for at least 10 minutes after foaming using a foaming device where Petricca stores whipped composition at room temperature and at 40 °F for 4-8 hours and discloses that "where the product should not excessive air coalescence when observed through a cross section and should not exhibit any substantial decrease in volume" which includes applicant's recited time for stability. Further, Staackmann teaches a process for producing a foam that is stable for at least 10 minutes which comprises forming a milk product by the method of claim 12 and forming a foam from the milk product by shaking or by using a foaming device (Column 1, line 68 to Column 2, line 24).

Regarding claim 17, Petricca teaches of whippable composition which provides stable foam as discussed earlier regarding claim 15. Whippable composition of Petricca may

include colors such as carotenes (see e.g., Column 4, lines 5-12) which will affect the color of the whipped product, however, it would have been a matter of routine determination for one of ordinary skill in the art at the time of the invention to utilize no coloring matter to create a white topping or to include white coloring matter to impart white color to the whippable or whipped composition. Changing the color of a food product based on desired appearance of the whipped product does not lend patentable distinction to claims where the composition was known.
Further regarding claim 17, Petricca also does not teach dispensing from an aerosol can, however, Staackmann teaches a spray can (i.e., aerosol container) that contains the milk product of claim 1 and is capable of dispensing the product as a stable foam (Column 1, lines 68-72 and Column 2, lines 7-10). Aerosol cans were known to be used for dispersal of whipped products at the time of the invention. Therefore, it would have been a matter of routine determination for one of ordinary skill in the art at the time of the invention to modify Petricca in view of Staackmann and utilize the foaming device as taught by Staackmann in order to dispense a foamy milk product as instantly claimed. One of ordinary skill would have been motivated to do so at least for the purpose of creating a whippable product that is readily dispersible as an aerated or whipped product for convenience to the consumer.

(B) Claims 12, 14 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Petricca (US 4107343) in view of the combination of Dictionary of Food ingredients (Page 111), Staackmann (US 3,519,440), further in view of Anderson et al (US 4888194), hereinafter Anderson.

Regarding claim 12, Petricca teaches of a method of making a sterilized and homogenized whippable emulsion comprising adding stabilizers, sweeteners, protein and milk components and flavors, emulsifiers and fats as claimed. Regarding the limitation of milk product Petricca teaches that the whippable product may comprise sodium caseinate (see Column 1, lines 50-53 and Tables I and II), which is salt of casein, i.e., milk protein. Petricca further teaches that although preferred sweetener is

sucrose, other nutritive sweeteners including lactose (i.e., milk sugar) can be used (Column 3, lines 17-24). Petricca also teaches of vegetable or animal sources of fat in the composition (Column 3, lines 3-4). Petricca also teaches of addition of milk to the composition prior to whipping (See Column 4, lines 61-63) i.e., Petricca discloses of a whippable milk product

The limitations of specific emulsifiers and composition and properties as recited in claim 12 are the same as recited in claim 1. Thus, composition of claim 12 and its resulting whippability and stability properties are rejected for the same reasons as discussed above regarding claim 1.

Regarding the process of making a whippable milk product of claim 12, Petricca teaches a method of making a whippable emulsion comprising adding stabilizers, sweeteners, protein and milk components and flavors and water etc., to which the emulsifiers are added and then fats are added. Thereafter the mixture is agitated and sterilized and cooled and aseptically homogenized (See Petricca Column 2, lines 45-64). Regarding the limitation of high temperature processing Petricca teaches of sterilization (Petricca Column 2, lines 55-60), as claimed. Thus, Petricca teaches the addition of fats after the addition of emulsifiers as instantly claimed. Regarding the order of steps applicants' are referred to MPEP 2144.04 [R-1] IV where it is stated that selection of any order of performing process steps is prima facie obvious in the absence of new or unexpected results.

Petricca is silent about the limitations of adding the emulsifiers to skim milk and then adding cream as a source of fat to the to the emulsion (lines 4-7 of claim 12 as recited). However, utilizing various dairy products, such as skim milk and cream in making a milk product was known at the time of the invention. Also addition of emulsifiers, additives and dry ingredients to a dairy product and forming an emulsion before adding more dairy product was also known at the time of the invention. For example, Anderson teaches a process of making a shelf stable aseptic dairy product which is capable of forming stable foam upon whipping (See Anderson, Column 2, lines 35-40). Anderson's dairy composition may include dairy cream "in combination with

whole or skim milk or milk solids in any proportions such that the desired butterfat content results" (Anderson, Column 3, lines 33-36). Regarding the process of making a whippable dairy product, Anderson also teaches that emulsifier is added to a portion of the cream (or dairy ingredient, such as skim milk) along with other ingredients and mixed and heated to ensure that the dry blend is completely dissolved. The mixture is then added to the remaining portion of cream and other additives added at this time with thorough mixing. The mixture is cooled and after cooling, the mixture is subjected to UHT processing (See Anderson, Column 6, lines 21-45 and lines 46-68).

Thus, process steps as recited in claim 12, including

- adding fats after the addition of emulsifiers in a process of making a room temperature stable whippable milk product was known in the art at the time of the invention (Petricca, Column 2, lines 45-65 and column 4, lines 45-50).
- Also the process of making a whippable dairy product where choosing a combination of dairy ingredients such as, skim milk, milk, milk solids and cream at least based on the availability and to achieve a desired fat content was known at the time of the invention (Anderson).
- Process for making a whippable dairy product where step of addition of emulsifiers to a part of dairy product to form an emulsion before adding the entire dairy component to the emulsion was well known in the art at the time of the invention (Anderson).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify Petricca and utilize a dairy ingredient, such as skim milk to mix with emulsifiers and other dry ingredients and blend to form an emulsion before adding the dairy based fat ingredient, such as cream as taught by Anderson in the process of making a stable whippable milk product. One of ordinary skill in the art would have been motivated to modify Petricca and include one or more milk based ingredients, such as skim milk, milk, milk solids and cream in any proportions, at least for the purpose of achieving a desired fat content in the whippable milk product (Anderson, Column 3, lines 33-36). Further it is noted that new recipes for food involving the addition of common ingredients do not amount to invention merely because the coaction or

cooperative relationship between the ingredients which produces new, unexpected, and useful function. In re Levin, 84 USPQ 232.
Regarding claim 14, Petricca discloses that it is preferred that the thickener (i.e., a stabilizer) comprises of microcrystalline cellulose and carboxymethyl cellulose (Column 1, lines 57-59), as instantly claimed.

Regarding claim 16, Petricca teaches of a foam that is stable for at least 10 minutes after foaming using a foaming device where Petricca stores whipped composition at room temperature and at 40 F for 4-8 hours and discloses that "where the product should not excessive air coalescence when observed through a cross section and should not exhibit any substantial decrease in volume" which includes applicant's recited time for stability. Further, Staackmann teaches a process for producing foam that is stable for at least 10 minutes which comprises forming a milk product by the method of claim 12 and forming foam from the milk product by shaking or by using a foaming device (Column 1, line 68 to Column 2, line 24).

Response to Arguments

Applicant's arguments with respect to amended claims 1, 3-4, 9-12 and 14-17 filed 2/20/2010 have been fully considered but are moot in view of the new ground(s) of rejection necessitated by applicant's amendment to independent claims 1 and 12.

Applicant's arguments regarding Petricca not teaching a milk product is still relevant and is addressed below.
Applicants remarks regarding Petricca teaching a non-milk emulsion (Remarks, page 6, last paragraph) and applicants' other argument is that "Petricca teaches essentially a non-dairy food product, which not only teaches away from Staackmann, but also away from the present claims, which are directed to a milk product" (Remarks, page 7, lines 6-8) have been fully considered but have not been not found persuasive. In response applicant is referred to Petricca Column 3, line 1 to Column 4, line 63, and also the

rejection of claims 1 and 12 above where it is disclosed that composition includes milk components and can also include milk.

In response to applicant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning (Remarks, page 7, paragraph 4) it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971). Applicant's argument is not convincing as obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). As the references of record were published before the time the invention was made, the references of record would be knowledge generally available to one of ordinary skill in the art at the time the invention was made and thus the knowledge contained therein would be available to one of ordinary skill in the art. Furthermore, the fact that all the references used in the rejection have publication dates before the filing date of applicant's application indicates that the emulsifier combination as claimed was known in the art and to modify the primary reference to include emulsifier combinations taught in secondary references to obtain the benefits taught would have been readily apparent to one skilled in the art. The rejection is not based on hindsight if the knowledge is obtained from the teaching of the prior art. Applicant has not presented any concrete reasoning or evidence to show why one skilled in the art would not have made the modification as set forth in the rejection.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL.** See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JYOTI CHAWLA whose telephone number is (571)272-8212. The examiner can normally be reached on 8:30 am to 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Keith Hendricks can be reached on (571) 272-1401. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/JC/
Examiner
Art Unit 1781

/Keith D. Hendricks/
Supervisory Patent Examiner, Art Unit 1781

Notice of References Cited	Application/Control No. 10/622,115	Applicant(s)/Patent Under Reexamination GROUX ET AL.	
	Examiner JYOTI CHAWLA	Art Unit 1781	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
	A	US-			
	B	US-			
	C	US-			
	D	US-			
	E	US-			
	F	US-			
	G	US-			
	H	US-			
	I	US-			
	J	US-			
	K	US-			
	L	US-			
	M	US-			

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	Igoe, Robert S.; Hui, Y. H. Dictionary of Food Ingredients (4th Edition).. Springer - Verlag, page 111.
	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

EXHIBIT C

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/622,115	07/18/2003	Michel John Arthur Groux	3712036-00486	1635

29157 7590 08/19/2010

K&L Gates LLP
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EXAMINER	
CHAWLA, JYOTI	
ART UNIT	PAPER NUMBER
1781	

NOTIFICATION DATE	DELIVERY MODE
08/19/2010	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

chicago.patents@klgates.com

Advisory Action Before the Filing of an Appeal Brief	**Application No.**	**Applicant(s)**	
	10/622,115	GROUX ET AL.	
	Examiner	**Art Unit**	
	JYOTI CHAWLA	1781	

--The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

THE REPLY FILED 30 July 2010 FAILS TO PLACE THIS APPLICATION IN CONDITION FOR ALLOWANCE.

1. ☐ The reply was filed after a final rejection, but prior to or on the same day as filing a Notice of Appeal. To avoid abandonment of this application, applicant must timely file one of the following replies: (1) an amendment, affidavit, or other evidence, which places the application in condition for allowance; (2) a Notice of Appeal (with appeal fee) in compliance with 37 CFR 41.31; or (3) a Request for Continued Examination (RCE) in compliance with 37 CFR 1.114. The reply must be filed within one of the following time periods:
   a) ☒ The period for reply expires 3 months from the mailing date of the final rejection.
   b) ☐ The period for reply expires on: (1) the mailing date of this Advisory Action, or (2) the date set forth in the final rejection, whichever is later. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of the final rejection.

   Examiner Note: If box 1 is checked, check either box (a) or (b). ONLY CHECK BOX (b) WHEN THE FIRST REPLY WAS FILED WITHIN TWO MONTHS OF THE FINAL REJECTION. See MPEP 706.07(f).

Extensions of time may be obtained under 37 CFR 1.136(a). The date on which the petition under 37 CFR 1.136(a) and the appropriate extension fee have been filed is the date for purposes of determining the period of extension and the corresponding amount of the fee. The appropriate extension fee under 37 CFR 1.17(a) is calculated from: (1) the expiration date of the shortened statutory period for reply originally set in the final Office action; or (2) as set forth in (b) above, if checked. Any reply received by the Office later than three months after the mailing date of the final rejection, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

NOTICE OF APPEAL

2. ☐ The Notice of Appeal was filed on _____. A brief in compliance with 37 CFR 41.37 must be filed within two months of the date of filing the Notice of Appeal (37 CFR 41.37(a)), or any extension thereof (37 CFR 41.37(e)), to avoid dismissal of the appeal. Since a Notice of Appeal has been filed, any reply must be filed within the time period set forth in 37 CFR 41.37(a).

AMENDMENTS

3. ☐ The proposed amendment(s) filed after a final rejection, but prior to the date of filing a brief, will not be entered because
   (a) ☐ They raise new issues that would require further consideration and/or search (see NOTE below);
   (b) ☐ They raise the issue of new matter (see NOTE below);
   (c) ☐ They are not deemed to place the application in better form for appeal by materially reducing or simplifying the issues for appeal; and/or
   (d) ☐ They present additional claims without canceling a corresponding number of finally rejected claims.

   NOTE: _____. (See 37 CFR 1.116 and 41.33(a)).
4. ☐ The amendments are not in compliance with 37 CFR 1.121. See attached Notice of Non-Compliant Amendment (PTOL-324).
5. ☒ Applicant's reply has overcome the following rejection(s): objection to claims 9 and 14.
6. ☐ Newly proposed or amended claim(s) _____ would be allowable if submitted in a separate, timely filed amendment canceling the non-allowable claim(s).
7. ☒ For purposes of appeal, the proposed amendment(s): a) ☐ will not be entered, or b) ☒ will be entered and an explanation of how the new or amended claims would be rejected is provided below or appended.
   The status of the claim(s) is (or will be) as follows:
   Claim(s) allowed: *None*.
   Claim(s) objected to: *None*.
   Claim(s) rejected: *1,3,4,9-12 and 15-17*.
   Claim(s) withdrawn from consideration: _____.

AFFIDAVIT OR OTHER EVIDENCE

8. ☐ The affidavit or other evidence filed after a final action, but before or on the date of filing a Notice of Appeal will not be entered because applicant failed to provide a showing of good and sufficient reasons why the affidavit or other evidence is necessary and was not earlier presented. See 37 CFR 1.116(e).
9. ☐ The affidavit or other evidence filed after the date of filing a Notice of Appeal, but prior to the date of filing a brief, will not be entered because the affidavit or other evidence failed to overcome all rejections under appeal and/or appellant fails to provide a showing a good and sufficient reasons why it is necessary and was not earlier presented. See 37 CFR 41.33(d)(1).
10. ☐ The affidavit or other evidence is entered. An explanation of the status of the claims after entry is below or attached.

REQUEST FOR RECONSIDERATION/OTHER

11. ☒ The request for reconsideration has been considered but does NOT place the application in condition for allowance because: See attached sheet.
12. ☐ Note the attached Information *Disclosure Statement*(s). (PTO/SB/08) Paper No(s). _____
13. ☐ Other: _____.

/Keith D. Hendricks/
Supervisory Patent Examiner, Art Unit 1781

/JC/
Examiner
Art Unit: 1781

DETAILED ACTION

Applicant's submission filed on July 30, 2010 has been entered. Applicant has amended claims 3, 9 and cancelled claim 14. Claims 1, 3-4, 9-12 and 15-17 remain pending in the application.

Claim Objections

Objections to claims 9 and 14 made in the previous office action of 5/14/2010 have been withdrawn based on applicant's amendments of 7/30/2010.

Response to Arguments under PTOL-303, Item 11, Request for reconsideration

Applicant's arguments with respect to claims 1, 3-4, 9-12 and 15-17 filed 7/30/2010 have been fully considered but are not persuasive for the following reasons:

i) Applicant argues against cited references by stating that "cited references, alone or in combination, fail to disclose or suggest each element of the rejected claims" (Remarks, page 4, last paragraph). Applicant's arrive at the above conclusion based on the statement that "references teach away from each other and are directed towards products having completely different objectives" (Remarks, page 5, lines 1-2 and page 5, last paragraph).

Applicants remarks regarding Petricca teaching a non-milk emulsion (Remarks, page 6, paragraph 2, lines 3-6) and applicants' other argument states that Petricca teaches essentially a non-dairy food product, which teaches away from Staackmann, and also teaches away from the present claims, which are directed to a milk product (Remarks, page 6, paragraphs 4 and 5) have been fully considered but have not been not found persuasive. In response applicant is referred to Petricca Column 3, line 1 to Column 4, line 63, and also the rejection of claims 1 and 12 in the previous office action where it is disclosed that composition includes milk components and can also include milk.

Regarding the limitation of milk product Petricca teaches that the whippable product may comprise sodium caseinate (see Column 1, lines 50-53 and Tables I and II), which is salt of casein, i.e., milk protein. Petricca further teaches that although preferred sweetener is sucrose, other nutritive sweeteners including lactose (i.e., milk sugar) can be used (Column 3, lines 17-24). Petricca also teaches of vegetable or animal sources of fat in the composition (Column 3, lines 3-4). Petricca also teaches of addition of milk to the composition prior to whipping (See Column 4, lines 61-63) i.e., Petricca discloses of a whippable milk product and does not teach against Staackmann or the claimed composition, as argued buy the applicant.

ii) Applicant further argues that Petricca and Staackmann can not be combined based on the conclusion that "cited references are directed towards products having completely unrelated objectives". This argument is also not persuasive and in response to applicant's argument that Petricca and Staackmann are is nonanalogous art, it has been held that a prior art reference must either be in the field of applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the applicant was concerned, in order to be relied upon as a basis for rejection of the claimed invention. See *In re Oetiker*, 977 F.2d 1443, 24 USPQ2d 1443 (Fed. Cir. 1992). In this case, Petricca teaches a whippable product, which may comprise milk (for example, see Column 4, lines 61-63), i.e., a milk product. As discussed in response to argument i). The product of Petricca is "whippable homogenized emulsion comprising water fat sweetener, dispersible protein, thickener, buffer and emulsifier" (Column 1, lines 30-34). However, Petricca does not specifically teach that the monoglycerides are unsaturated monoglyceride in the amount of 0.005 to 0.15% by weight of the composition, as recited in the independent claim 1. Staackmann teaches of whippable topping, i.e., a foamable composition which falls in the same field of endeavor as Petricca and therefore Petricca and Staackmann both are directed towards similar objective of making a whippable or foamable food product as instantly claimed.

Further in response to applicant's argument that "references teach away from each other and are directed towards products having completely different objectives"

(Remarks, page 5, lines 1-2 and page 5, last paragraph), applicant is referred to the rejection of claim 1 in the final office action of 5/14/2010 where the rejection clearly pointed out that Petricca teaches a whippable product, wherein the emulsifying composition having fatty acid moiety in polyglycerol ester can be "one or more even numbered C_{12-22} saturated or unsaturated monocarboxylic acid" (see Column 3, lines30-35) and that "mono and diglycerides may also be utilized in an attempt to reduce whipping time for the emulsion without affecting the stability" (Column 3, lines 63-66). Petricca discloses that emulsifying composition having fatty acid moiety in polyglycerol ester can be "one or more even numbered C_{12-22} **saturated or unsaturated monocarboxylic acid**" (see Column 3, lines30-35) (Emphasis added) and that "mono and diglycerides may also be utilized in an attempt to reduce whipping time for the emulsion without affecting the stability" (Column 3, lines 63-66). However, Petricca does not specifically teach that the monoglycerides are unsaturated monoglyceride in the amount of 0.005 to 0.15% by weight of the composition, as recited in the independent claim 1. Staackmann is being relied upon to show the conventionality of utilizing unsaturated monoglyceride in the range claimed by the applicant. Staackmann teaches of whippable topping, i.e., a foamable composition as discussed in response to argument ii) and the final office action of 5/14/2010. Regarding the selection of emulsifiers Staackmann discloses from the group consisting of propylene glycol monostearate (Column 3, lines 48-68), and fatty acid glycerides obtained from various fatty acids including unsaturated fatty acids, such as oleic, palmitoleic, myristooleic etc (See Staackmann Column 3, lines 3-12, 30-35 and 48-68) i.e., unsaturated monoglycerides and combinations thereof in the amount of 0.1% (Column 5, composition A), which overlaps the range 0.005% to 0.15% unsaturated monoglyceride as claimed. Thus, the two references Petricca and Staackmann both teach stable emulsions, which can be whipped, wherein the composition comprise monoglycerides are directed towards foamable or whippable products and do not teach against each other, as alleged by the applicant.

Since, Petricca and Staackmann both teach stable emulsions as claimed, it would be obvious that the emulsifiers used by the compositions would function similarly

by helping form a stable dispersion of the individual components in an emulsion, i.e., would be regarded as functional equivalents. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Petricca in view of Staackmann and substitute one art recognized functional equivalent (i.e., mono-glyceride of a fatty acid) for another (i.e., monoglyceride of an unsaturated fatty acid) in the whippable product as disclosed by Petricca at least based on which emulsifying agents were more easily available and affordable at the time the invention was made. The Courts have held that the selection of a known material, which is based upon its suitability for the intended use, is within the ambit of one of ordinary skill in the art. See *In re Leshin*, 125 USPQ 416 (CCPA 1960) (see MPEP § 2144.07).

iii) In response to applicant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning (Remarks, page 7, paragraph 4) it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971). Applicant's argument is not convincing as obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). As the references of record were published before the time the invention was made, the references of record would be knowledge generally available to one of ordinary skill in the art at the time the invention was made and thus the knowledge contained therein would be available to one of ordinary skill in the art. Furthermore, the fact that all the references used in the rejection have publication dates before the filing date of applicant's application indicates that the emulsifier combination as claimed was known

in the art and to modify the primary reference to include emulsifier combinations taught in secondary references to obtain the benefits taught would have been readily apparent to one skilled in the art. The rejection is not based on hindsight if the knowledge is obtained from the teaching of the prior art. Applicant has not presented any concrete reasoning or evidence to show why one skilled in the art would not have made the modification as set forth in the rejection.

iv) Applicant's other main argument against examiner's position of emulsifiers sorbitan monostearate and sorbitan tristearate being functional equivalents (Petricca in view of Igoe). Applicant argues that the two emulsifiers are not functional equivalents and applicant's base this argument on the differences in dispersibility of the two emulsifiers as discussed in Igoe (reference of record) in remarks on page 7, lines 7-20). Applicant's argument is not persuasive because Igoe clearly states that sorbitan tristearate also known as Polysorbate 65 and Span 65 is a non-ionic surfactant (emulsifier) which is dispersible in fat, oil and water and was known in the art of food at the time of the invention as disclosed by Dictionary of Food Ingredients, page 111. Sorbitan monostearate is also water dispersible. Regarding the specific use and amount of sorbitan tristearate, Igoe teaches that sorbitan tristearate is added to foods, such as, frozen desserts, cakes and coffee whiteners; frequently used with sorbitan monostearate or mono and diglycerides (other emulsifiers) typically in amounts 0.1 to 0.4%, which includes applicants' recited amount of 0.005 to 0.15% by weight.

Further regarding applicant's argument about the differences in dispersibility of sorbitan stearate emulsifiers, it is noted that both sorbitan monostearate and sorbitan tristearate are both water dispersible and are frequently used together or with other emulsifiers (Igoe page 111). Moreover the invention as claimed comprises more than one emulsifier and also comprises **fat in 0-40% by weight of the composition**, it would have been obvious that water dispersibility of an emulsifier is one of the desired features for the composition as the composition as claimed includes fat as an optional ingredient.

It is further noted that compounds sorbitan monostearate (Petricca) and sorbitan tristearate (Dictionary of Food Ingredients) are both fatty acid esters of sorbitan that are safe to use in foods and are both compounds have the following characteristics in common:

both are sorbitan esters of stearic acid,

both are water dispersible (Igoe and applicant's remarks page 7, lines 10-20),

both are non-ionic surfactants or emulsifiers (Igoe),

both are capable of being used in whipped or whippable food compositions (Petricca and Igoe),

recommended usage amount for both overlaps the claimed range of the applicant (Petricca and Igoe).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention that sorbitan monostearate (Petricca) and sorbitan tristearate (Dictionary of Food Ingredients) will function similarly (or emulsify) when added to a whippable composition, i.e., would be regarded as functional equivalents. Therefore, it would have been matter of routine determination for one of ordinary skill in the art at the time the invention was made to modify Petricca in view of Dictionary of Food Ingredients and substitute art recognized functional equivalent of a fatty acid ester of sorbitan (i.e., sorbitan monostearate) for another (i.e., sorbitan tristearate) in the whippable product as disclosed by Petricca at least based on which ester of sorbitan was more effective as an emulsifier, more affordable and more easily available at the time the invention was made. The Courts have held that the selection of a known material, which is based upon its suitability for the intended use, is within the ambit of one of ordinary skill in the art. See *In re Leshin*, 125 USPQ 416 (CCPA 1960) (see MPEP § 2144.07).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JYOTI CHAWLA whose telephone number is (571)272-8212. The examiner can normally be reached on 8:30 am to 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Keith Hendricks can be reached on (571) 272-1401. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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Supervisory Patent Examiner, Art Unit 1781

EXHIBIT D

United States Patent [19]

Petricca

[11] **4,107,343**

[45] **Aug. 15, 1978**

[54] **WHIPPABLE EMULSION STABLE AT ROOM TEMPERATURE**

[75] Inventor: **Anthony V. Petricca, Cleveland, Ohio**

[73] Assignee: **SCM Corporation, Cleveland, Ohio**

[21] Appl. No.: **854,088**

[22] Filed: **Nov. 23, 1977**

Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 739,511, Nov. 8, 1976, abandoned, which is a continuation of Ser. No. 589,497, Jun. 23, 1975, abandoned.

[51] **Int. Cl.**[2] **A23G 3/00**

[52] **U.S. Cl.** **426/564; 426/570; 426/399**

[58] **Field of Search** 426/98, 99, 103, 564, 426/568, 570, 804, 399

[56] **References Cited**

U.S. PATENT DOCUMENTS

3,230,091	1/1966	Thompson	426/570
3,350,209	10/1967	Rodgers	426/570
3,353,965	11/1967	Patterson	426/570
3,495,990	2/1970	Kayser	426/570
3,560,220	2/1971	Bangert	426/98
3,806,605	4/1974	Patterson	426/570

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[57] ABSTRACT

A pourable, whippable, edible emulsion, containing about 45 to 60% water, 20 to 30% fat, 7 to 20% sweetener, 0.5 to 2.5% dispersible protein, 0.1 to 0.75% thickener, 0.1 to 1.0% buffer and 0.75 to 2.5% emulsifier, where the emulsifier has a major proportion of propylene glycol monostearate or hexaglycerol distearate in the range from 0.5 to 1.5% and a minor proportion of a combination of ethoxylated sorbitan ester in the range from 0.3 to 0.6%, sorbitan monostearate in the range from 0.05 to 0.25% and lecithin in the range from 0 to 0.15%, is stable against separation and/or gelation for at least one year at room temperature under aseptic conditions and whippable to at least 200% overrun from about 40° to 100° F.

8 Claims, No Drawings

WHIPPABLE EMULSION STABLE AT ROOM TEMPERATURE

CROSS-REFERENCE TO RELATED APPLICATIONS

The present application is a continuation-in-part of my pending application Ser. No. 739,511 filed Nov. 8, 1976, now abandoned which in turn is a continuation of my copending application Ser. No. 589,497 filed June 23, 1975 and now abandoned.

BACKGROUND OF THE INVENTION

Heretofore a variety of whippable emulsions have been proposed for food toppings. The fluid ones of commerce are usually stored in refrigerated or frozen condition to prolong their shelf stability. Dry powder types have prolonged shelf stability, but require reconstitution with water or milk and fairly special handling to whip efficiently. These products will not normally stand the heat processing required to render them commercially sterile and yet remain stable at ordinary room temperature while still retaining the convenient fluid condition. All are oil-in-water emulsions containing fat variously emulsified, sweetener, and often dispersible protein, thickener, and buffer salt, usually with some flavor and color.

SUMMARY OF THE INVENTION

The present invention is a pourable, edible, whippable homogenized emulsion comprising water, fat, sweetener, dispersible protein, thickener, buffer and emulsifier, the emulsifier comprising a major proportion of a partial fatty ester of propylene glycol or a fatty polyglycerol ester and a minor proportion of partial fatty esters of higher polyols and their ethoxylated derivatives, such polyols being glycerin, sorbitol with inner anhydride groups (sorbitan), and the like.

A preferred formulation is a pourable, edible, homogenized emulsion consisting essentially of, by weight based on total emulsion, about 45 to 60% water, about 20 to 30% fat, about 7 to 20% sweetener, about 0.5 to 2.5% dispersible protein, about 0.1 to 0.75% thickener, about 0.1 to 1.0% buffer and about 0.75 to 2.5% emulsifier, said emulsifier consisting essentially of a major proportion of propylene glycol monostearate or hexaglycerol distearate in the range of about 0.5 to 1.5% and a minor proportion of a combination of ethoxylated sorbitan ester in the range of about 0.3 to 0.6%, sorbitan monostearate in the range of about 0.05 to 0.25% and lecithin in the range of about 0 to 0.15%, said emulsion being substantially stable against separation and/or gelation for at least about one year at room temperature under aseptic conditions and whippable in the temperature range from about 40° to 100° F. to at least about 200% overrun. It is preferred that the thickener be a major proportion of microcrystalline cellulose and a minor proportion of sodium carboxymethyl cellulose. This emulsion has exceptional storage stability, which is thought to result from the unusual combination of emulsifiers employed. Food grade ingredients are used throughout.

DETAILED DESCRIPTION OF THE INVENTION

Typical formulations of the whippable emulsion are shown in Table I.

TABLE I

Ingredient	Broad Range %	Preferred Range %	Function
Sucrose crystals	7-20	12-15	Sweetener
Sodium caseinate	0.5-2.5	1.25-2.0	Whipping agent
Microcrystalline cellulose	.1-.75	0.25-0.60	Thickener (Stabilizer)
Fat-preferably of hard butter quality	20-30	22.0-28.0	Bodying & whipping agent
Propylene glycol monostearate or hexaglycerol distearate	0.50-1.50	1.0-1.5	Emulsifier
Polysorbate 60	0.2-0.5	0.3-0.4	Emulsifier
Sorbitan monostearate	.05-.25	0.1-0.2	Emulsifier
Polysorbate 80	0.01-0.10	0.01-.05	Emulsifier
Lecithin	0-0.15	0.03-0.12	Emulsifier
Beta-carotene-S-beadlets	0-0.1	.003-.006	Coloring
Sodium metaphosphate	0.1-1	0.2-0.6	Buffer
Water	45-60	55-60	Carrier
Total	100	100	

These are "single strength" formulations which make ready-to-whip emulsions.

Formulations of concentrated emulsions for dilution at the rate of 2 volume parts of the emulsion to one volume part of water before whipping are shown in Table II.

TABLE II

Ingredient	Broad Range %	Preferred Range %
Sucrose crystals	15-30	18.0-24.0
Sodium caseinate	0.75-4.0	1.5-2.5
Microcrystalline cellulose	0.1-1.0	0.4-0.8
Fat-preferably of hard butter quality	30-50	35.0-45.0
Propylene glycol monostearate or hexaglycerol distearate	0.25-2.5	1.0-2.0
Polysorbate 60	0.1-1.0	0.3-0.6
Sorbitan monostearate	0.1-0.50	0.2-0.4
Polysorbate 80	0.01-0.10	0.02-0.07
Lecithin	0-0.25	0.12-0.20
Beta-carotene-S beadlets	0.0-0.1	0.005-0.01
Sodium metaphosphate	0.1-0.5	0.2-0.6
Water	30-40	30-40
Total	100.00	100.00

Typical processing is as follows: the sugar and cascinate solids are dry blended. In a separate vessel the microcrystalline cellulose, coloring agent, flavor and phosphate buffer are added to the water and agitated and heated to about 100° F. The dry blend of sugar and cascinate is then added to the warmed aqueous mixture and the mixture further heated to 120° F. with agitation. The emulsifiers then are added, and finally the fat. The mixture is heated to about 160° with agitation until a smooth, uniform mixture results. This uniform mixture is sterilized at about 295° F. for six seconds, then cooled to about 165°-170° F. and aseptically homogenized through a homogenizing valve with a back pressure of 1,500-3,000 psig to form the emulsion. The thus commercially sterile, homogenized emulsion then is cooled to 40°-100° F. and introduced into the aseptic package under aseptic conditions and the package sealed.

The preferred fat is one that exhibits hard butter properties so it has excellent mouth feel and a melting point at approximately body temperature (98.6° F.). Such fat will be ostensibly hard at 50°-70° F. and from about 70° up to about 110° F. loses virtually all, if not

all, of its solids content upon warming. Other fats can be used, but those with W.M.P. substantially above 114° F. often have a slightly waxy mouth feel. The fats can be of vegetable (including nut) or animal origin, e.g. hydrogenated or unhydrogenated palm kernel, coconut, cottonseed, soybean, peanut, palm, tallow, lard, etc.

Stabilizer comprising a major proportion of water-insoluble components is preferred. Microcrystalline cellulose is an excellent stabilizer or thickener for this purpose; the commercially available products usually, and preferably, contain a minor proportion of sodium carboxymethyl cellulose. Other stabilizers that can be used in conjunction with such cellulose or even by themselves include: sodium carboxymethyl cellulose, guar, gum arabic, locust bean, acacia, tragacanth, carrageenan, xanthan, agar, ghatti, or karaya.

The preferred sweetener is sucrose, which can be obtained in crystalline or liquid form, the latter having water that has to be compensated for in formulation. Other nutritive sweeteners that can be used include: corn syrup solids, dextrose, fructose, glucose, lactose, or corn syrup. Non-nutritive sweeteners such as sodium saccharin can be used, these, of course, being in extremely small proportion.

Emulsification of the fat is done with about 2–5% food approved emulsifier and most generally with less than 4% because some of the necessary emulsifiers in stronger proportion can impart undesirable flavor. The major part of the emulsifier is either a partial fatty ester of propylene glycol or a fatty polyglycerol ester. By "fatty" in the specification is meant there is an edible fatty acid moiety. Such fatty acid moiety being one or more even-numbered C_{12-22} saturated or unsaturated monocarboxylic acid. The fatty acid generally is quite highly saturated for hardness, e.g. to an iodine value (I.V.) of at least as low as about 60 and preferably much lower, i.e., 0–3.

The partial fatty ester of propylene glycol usually is made by reacting propylene glycol with an edible fat followed by distillation of excess polyol from the neutralized alkali-catalyzed reaction mixture. The resulting purified emulsifier is typically 35–60% partial fatty esters of propylene glycol mixed with partial esters of glycerin. The partial fatty esters or specifically the monoester can be distilled from the reaction mixture to provide a material of higher purity. Alternatively, such ester for this use can be made by direct esterification of propylene glycol with a fatty acid to give 40 to 85% propylene glycol monoester with the remainder being propylene glycol diester. The propylene glycol monoester can be distilled from the fatty acid reaction products to provide a monoester of 80–95% purity.

The fatty acid ester of polyglycerol customarily can be made by esterifying a polyglycerol broadly having 2–10 glycerol units, preferably 5–7, with 1.5 to 3 fatty acid units on the average. Also, the polyglycerol ester may be prepared by interesterifying the polyglycerol with hydrogenated triglycerides of 60 I.V. or lower.

The other minor emulsifiers preferably are fatty acid esters of sorbitan and ethoxylated sorbitan esters, although these can be replaced by other corresponding hexitan and ethoxylated hexitan esters, such as those prepared from mannitol and ethoxylated partial esters of glycerol. Mono and diglycerides may also be utilized in an attempt to reduce the whipping time for these emulsions without affecting the stability.

It is preferred to buffer the mixture with sodium metaphosphate or sodium hexametaphosphate, monosodium phosphate, disodium phosphate, trisodium phosphate, mono, di, or tripotassium phosphate, tetrasodium pyrophosphate, tetrapotassium pyrophosphate sodium or potassium tripolyphosphate, potassium metaphosphate, sodium trimetaphosphate, sodium tetrametaphosphate. This imparts additional resistance to gelation and minimizes deleterious heat effect on the mixture. Edible colorants such as beta-carotene in minute proportion and frequently a minute amount of flavor such as an artificial edible butter flavor is added in the emulsion. Other colorants and even certain vitamins can be added if desired.

Much of the emulsion processing is done at a temperature above the melting point of the fats and any emulsifiers present to achieve a fine grade emulsification. The homogenization is done conventionally, usually by passing the preformed emulsion through a pressure reducing valve with enormous pressure drop.

The preferred way to package the emulsion is by aseptic packaging, such as aseptic canning, or by aseptic form-fill-and seal procedures when the container is made of laminated plastics. The container is a conventional hermetically sealed one such as a metal can appropriately lacquered with an inert lining, or a hermetically sealed glass container, plastic container or paper bottle, the latter being appropriately lined with food-approved coatings.

In such operation the emulsion is heat sterilized at 280°–325° F., then poured into a presterilized container under aseptic conditions, and the container is aseptically sealed. For effective sterilization the emulsion can be heated to 320°–325° F. with no holding time necessary. At low temperatures, i.e. 280°–290° F., holding time can be from 2–10 seconds. Alternatively, the unsterilized emulsion can be poured into an unsterilized container, the container sealed, and the filled container subjected to retorting or the like at 220°–260° F. for 15–60 minutes, or the sterilized emulsion may be poured into chemically or heat treated "long-life" containers and subsequently stored at refrigerated conditions for purposes of obtaining extended shelf stability at refrigerated temperatures. Frequently, particularly in the aseptic processing, the homogenization is done after sterilizing the emulsion and at a temperature of 130°–190° F. under aseptic conditions preparatory to filling the sterile container. For clarity, the term "sterile" or "commercially sterile" product is defined as one capable of remaining sterile for a minimum of one year of shelf life at room temperature or a minimum of 24 weeks at 100° F.

When the resulting sterile product is opened, it must, of course, be refrigerated to prolong its shelf life. The single strength emulsion can be poured and whipped at room temperature or at a temperature of 40°–100° F. for 3–5 minutes with a conventional electric mixer to yield a topping having an overrun in excess of 200%. The concentrated emulsion can be poured and whipped at room temperature or at 40°–100° F. with a conventional mixer to yield a topping having an overrun in excess of 200%. Two parts of the concentrated emulsion are admixed with one part of water. If desired, cold milk can be used for dilution instead of water to achieve an even richer product.

The following examples show how this invention may be practiced, but should not be construed as limiting the invention. In this specification all parts are parts by weight, all percentages are weight percentages and all temperatures are in degrees Fahrenheit unless other-

wise expressly noted. To prepare the emulsion utilized in each of the following examples the procedure described herein is followed:

1. The entire amount of the protein (caseinate) is dry blended with some of the sweetener (sugar). If liquid sweetener (syrups) is used, the caseinate can be dispersed into the requisite amount of water and the resulting aqueous solution can be added to the liquid sweetener.

2. To the correct amount of water, well agitated, the stabilizer, buffer, coloring agent, and flavorant are added. The resulting aqueous mixture is heated to about 100° F.

3. To the luke-warm water is added the dry blend of caseinate-sugar mixture as well as the remainder of the sugar.

4. The entire aqueous mixture of (3) is heated to about 120°–125° F. at which time the fat and emulsifiers are added.

5. The mixture resulting in (4) is heated to about 145°–160° F. and pumped to a surge tank wherein the mixture is kept agitated.

6. The mixture is rendered commercially sterile by heat. Depending on the available equipment or the desired sterilizing procedure, the mixture can be heated directly with steam infusion or injection, or indirectly such as by circular tube, plate (press), or scraped surface heat exchangers. In-can sterilization can be accomplished in a retort, if desired. Normally, sterilization values (F_o) equivalent from about 10 to 50 minutes at 250° F. are desired to achieve the required shelf-stability.

7. Subsequent to heat treatment the mixture is homogenized aseptically at pressures of from 500 to 6,000 psi and at a temperature above the melting point of the fat and emulsifiers. The same pressure and temperature conditions are applicable to incontainer sterilization.

8. The heat treated product can be packaged by any suitable process into presterilized containers such as glass jars, pouches, laminated, molded or formed plastic containers or cans. A typical unit is a Dole aseptic canning unit which is capable of providing aseptic medium for the cans, their lids, and the canning process.

EXAMPLE 1

Following the procedure described above, 2 parts of sodium caseinate were mixed with some sucrose (13.50 parts total) to provide an intimately mixed dry blend. To 58.20 parts of potable water the following ingredients were added: 0.25 part microcrystalline cellulose (Avicel 581), 0.003 part of 2.4% betacarotene-S beadlets, and 0.25 part sodium metaphosphate as buffer. The water mixture was warmed to about 100° F. with agitation. The caseinate-sugar blend and the remainder of sugar were then added to the agitated warm water which was heated up to about 120° F., at which temperature 24.0 parts of hard butter fat (Durkee's Paramount X; Wiley Melting Point of about 110° F., contains 0.4% lecithin) and the following emulsifiers were added: 0.30 part polysorbate 60 (Durfax 60), 0.19 part sorbitan monostearate (Durtan 60), 0.05 part polysorbate 80 (Durfax 80), and 1.25 part of propylene glycol monostearate (PGMS). The entire liquid-fat-emulsifier mixture was heated to about 150° F. and then transferred by pumping to a surge tank. The admixture was then sterilized utilizing all the sterilization procedures described earlier such as circular tube heat exchanger, scraped surface heat exchanger, a plate or press heat exchanger, steam infusion or steam injection heat exchanger or a falling film heat exchanger, all working especially well. For convenience, a Dole aseptic unit which provides for sterilizing the cans into which the emulsion will be stored works quite well. The emulsion herein was sterilized for 4 seconds at 290° F.

The single strength emulsion was stored in the can for a year at room temperature (about 70° F.) and tested afterwards showing excellent properties and maintaining sterile and stable conditions.

The evaluation procedure is as follows:

Samples of the processed emulsion are stored at about −20° F., 0° F., 40° F., 70° F., 84° F. and 100° F. for periods of up to 1 year. Additional samples are cycled from about −20° F. to about 40° F. for a minimum of 5 cycles. Representative samples from each storage condition are withdrawn from storage at regular intervals and are evaluated for stability and performance at both 40° F. and 70° F.

Emulsion viscosity, color, fat and/or serum separation, pH, whip time, whipped specific gravity, penetration after whipping (stiffness), resistance to air coalescence, and resistance to syneresis and shrinkage are the properties which are measured for storage evaluations.

The normal range of viscosity for the single strength emulsion is 190 to 300 cps at 70° F. and 300 to 800 cps at 40° F. For more concentrated emulsions the range is 1,000 to 2,000 cps at 70° F. and 2,000 to 3,500 cps at 40° F.

The color of the emulsions is measured subjectively by visual observation. However, if darkening or browning of the emulsion is evident or questionable, the color is measured with the aid of a colorimeter.

Fat and/or serum separation is measured by observation of the emulsion upon opening of the container. For one quart of emulsion the separation should not exceed a 1 cm. supernatant layer.

The whip time of the emulsion will vary with both the temperature of the mix and the type of mixing equipment used. The consumer may use either a household type hand-held mixer or an institutional type mixer ranging in capacity from 5 to 80 quarts. The whip time in a household type mixer will vary from about 2 to 10 minutes when the initial emulsion temperature is 70° F. and will vary from about 2 to 5 minutes when the initial emulsion temperature is 40° F. The whip time in an institutional type mixer will range from about 3 to 10 minutes when the initial emulsion temperature is 40° F. and will range from about 3 to 10 minutes when the initial emulsion temperature is 70° F.

The whipped specific gravity is determined by a fixed volume to weight relationship. An inverse relationship exists between the amount of aeration (overrun) and the specific gravity. A specific gravity range of from 0.20 to 0.40 is usually achievable. A specific gravity of about 0.25 is preferred.

The penetration after whipping is determined with the aid of a Precision Penetrometer equipped with a 55-gram blunt bob. The bob is allowed to penetrate the whipped mass for approximately 30 seconds. Penetration readings on whipped products may vary appreciably depending on the intended use and preference of the user. Thus, a penetration reading of 10 to 25 millimeters would be indicative of a household preference whereas a penetration reading of 3.0 to 10.0 would be indicative of an institutional preference.

The resistance to air coalescence and shrinkage are determined by filling containers of known volume with

whipped product and subsequently storing the containers at both room temperature and 40° F. for from 4 to 8 hours. The product should not exhibit excessive air coalescence when observed through a cross section and should not exhibit any substantial decrease in volume.

EXAMPLE 2

Example 1 was repeated where the major emulsifier was hexaglycerol distearate ester with the same excellent results.

EXAMPLE 3

A concentrated emulsion was prepared in the same manner described in Example 1 except the amounts were as follows (sodium caseinate: 2.2 parts, sucrose: 20 parts, Avicel 581: 0.5, fat (Paramount): 40 parts, polysorbate 60: 0.5 part, sorbitan monostearate: 0.23 part, polysorbate 80: 0.05 part, propylene glycol monostearate: 1.50 part, beta-carotene-S-beadlets: 0.007 part and the balance of about 35 parts of potable water. Again the results as evaluated according to the procedure described earlier were excellent.

EXAMPLE 4

Example 3 was repeated except that the major emulsifier was hexaglycerol distearate ester. The results were substantially the same.

EXAMPLE 5

Examples 1 and 4 were repeated utilizing corn syrup (24 D.E. and 36 D.E.) in place of the sucrose with substantially comparable results.

EXAMPLE 6

Examples 1 and 2 were repeated utilizing stabilizers other than Avicel 581. In particular, locust bean gum and xanthan gum and carrageenan and a combination thereof were incorporated in about the same amount (0.5 part) showing comparable evaluation results.

As discussed earlier, the pourable emulsion described by the present invention can be prepared in "single strength" for immediate whipping by the user or in concentrated strength for dilution with water or other suitable liquid such as milk prior to whipping. In another aspect, then, the present invention is concerned with the process for preparing the liquid emulsion, which process is advantageously designed to provide the exceptionally long stability and whippability of the emulsion as described hereinbefore.

Briefly, the process for preparing the commercially sterile and pourable emulsion of the present invention comprises blending a sweetener, a proteinaceous component, a thickening agent, fat, and emulsifiers therefor in an aqueous medium to make up a liquid blend, homogenizing said blend to produce a stable emulsion, and packaging said emulsion in containers under sterile conditions, and wherein said emulsifiers are made up of a major proportion selected from the group consisting of fatty acid ester of propylene glycol and fatty acid ester of polyglycerol and a minor proportion selected from fatty acid partial esters of a polyol of three or more carbon atoms and their ethoxylated derivatives and lecithin.

More specifically, the process for preparing a liquid emulsion which is stable at room temperature for at least about one year, and which is capable of being whipped up to about 100° F. comprises the steps of forming an aqueous blend consisting essentially of, by weight,

45 — 60% water
7 — 20% sweetener
0.5 — 2.5% dispersible protein
0.1 — 0.75% thickener
0.1 — 1.0% buffer
20 — 30% fat and
0.75 — 2.5% emulsifiers

wherein said emulsifiers comprise one major proportion selected from partial fatty acid esters of propylene glycol and fatty acid ester of polyglycerol and one minor proportion selected from fatty acid esters of a polyol having three or more carbon atoms and/or the corresponding ethoxylated derivatives and lecithin. Preferably the major proportion is in the range from about 0.5 to 1.5% and the minor proportion is a combination of sorbitan monostearate in the range from about 0.05 to 0.25%, ethoxylated sorbitan ester in the range from about 0.3 to 0.6% and lecithin in the range from about 0 to 0.15%.

What is claimed is:

1. A pourable, edible, homogenized emulsion consisting essentially of about 45 to 60% water, about 20 to 30% fat, about 7 to 20% sweetener, about 0.5 to 2.5% dispersible protein, about 0.1 to 0.75% thickener, about 0.1 to 1.0% buffer and about 0.75 to 2.5% emulsifier, said emulsifier consisting essentially of a major proportion of propylene glycol monostearate or hexaglycerol distearate in the range of about 0.5 to 1.5% and a minor proportion of a combination of ethoxylated sorbitan ester in the range of about 0.3 to 0.6%, sorbitan monostearate in the range of about 0.05 to 0.25% and lecithin in the range of about 0 to 0.15%, said emulsion being substantially stable against separation and/or gelation for at least about one year at room temperature under aseptic conditions and whippable in the temperature range from about 40° to 100° F. to at least about 200% overrun.

2. An emulsion according to claim 1 wherein said thickener comprises a major proportion of water-insoluble thickener.

3. An emulsion according to claim 2 wherein said water-insoluble thickener is microcrystalline cellulose.

4. An emulsion according to claim 1 wherein said thickener comprises a major proportion of microcrystalline cellulose and a minor proportion of sodium carboxymethyl cellulose.

5. An emulsion according to claim 1 in sterile condition.

6. An emulsion according to claim 1 wherein said buffer is sodium metaphosphate.

7. An emulsion according to claim 5 packaged in a sealed, interiorly sterile container.

8. An emulsion according to claim 7 wherein said thickener compriscs a major proportion of microcrystalline cellulose and a minor proportion of sodium carboxymethyl cellulose and said buffer is sodium metaphosphate.

* * * * *

EXHIBIT E

Title: Dictionary of Food Ingredients (4th Edition)
Publisher: Springer - Verlag
Copyright / Pub. Date: © 2001
ISBN: 978-0-8342-1952-6
Electronic ISBN: 978-1-59124-784-5
No. Pages: 234
Author/Editor: By: Igoe, Robert S.; Hui, Y. H.
Knovel Release Date: Jan 7, 2005
Knovel Subject Area(s): Food Science
Description: This dictionary is an unparalleled source of information, providing practical, scientific, and regulatory information on every important ingredient and category. It will be of value to food scientists, ingredient suppliers, dietitians, extension specialists and students. Defines and describes some 1,000 food ingredients and additives, including natural ingredients, FDA-approved artificial ingredients, and compounds used in food processing. Definitions cover functionality, chemical properties, and applications. New to this edition is a section which groups ingredients by function and describes characteristics and applications of each group.

Polyoxyethylene (20) Sorbitan Monostearate—An emulsifier manufactured by reacting stearic acid with sorbitol to yield a product which is reacted with ethylene oxide. It is a nonionic, water-dispersible surface-active agent which is very hydrophilic. It is also termed polysorbate 60. It is used in whipped vegetable toppings for overrun and lightness; in cakes for increased volume and fine grain; in icings and confectionery for lightness and syneresis control; and in salad dressing for emulsion stability. It is frequently used with sorbitan monostearate or mono- and diglycerides. The typical usage range is 0.10 to 0.40 percent.

Polyoxyethylene (20) Sorbitan Tristearate—An emulsifier manufactured by reacting stearic acid with sorbitol to yield a product which is then reacted with ethylene oxide. It is a nonionic surface-active agent which is dispersible in fat, oil, and water. It is also termed polysorbate 65. It is used in frozen desserts, cakes, and coffee whiteners. It is frequently used with sorbitan monostearates or mono- and diglycerides. Typical usage range is 0.10 to 0.40 percent.

Polyoxyl (40) Stearate—An emulsifier and antifoaming agent used in processed foods, fruit jellies, and sauces.

Polyphosphates—Phosphates containing two or more phosphorous atoms per molecule, being formed when orthophosphates are heated under controlled conditions. Pyrophosphates have two phosphorous atoms (for example, sodium acid pyrophosphate); tripolyphosphates having three phosphorous atoms (for example, sodium tripolyphosphate). Further heating polyphosphates and chilling forms a longer chain (for example, sodium hexametaphosphate). Functions include sequestering, buffering, and chelating. They are also termed condensed phosphates.

Polysorbate 60—***See Polyoxyethylene (20) Sorbitan Monostearate.***

Polysorbate 65—***See Polyoxyethylene (20) Sorbitan Tristearate.***

Polysorbate 80—***See Polyoxyethylene (20) Sorbitan Monooleate.***

Polysorbates—***See Polyoxyethylene Sorbitan Fatty Acid Esters.***

Pomace—Ground apple or fleshy fruit in the dry form.

Popcorn—Indian corn that explodes when exposed to dry heat due to the expansion of the kernel.

Poppy Seed—A seasoning that is a seed of *Papaver somniferum* L. Poppy seeds have a nutty flavor. They are used in breads, cakes, and butter sauce for vegetables, lending a nutlike flavor.

EXHIBIT F

United States Patent Office

3,519,440

Patented July 7, 1970

3,519,440

AEROSOL TOPPINGS

Joachim W. Stueckmann, Tinley Park, and Arlen R. Campbell, Danville, Ill., assignors to CPC International Inc., New York, N.Y., a corporation of Delaware

No Drawing. Filed June 12, 1967, Ser. No. 645,486

Int. Cl. B65b 31/00

U.S. Cl. 99—189

14 Claims

ABSTRACT OF THE DISCLOSURE

Aerosol whipped toppings for ice cream and other desserts having a solids content of 60–70% existing in an aqueous emulsion form, which composition includes in carefully proportioned amounts, sugar, fat, non-fat milk solids, water and a unique emulsifying system promoting adequate over-run when expelled from the pressurized container. Composition is also stable and resistant to microbial attack under storage conditions at room temperature.

There is an ever increasing consumer demand for toppings which can be dispensed from aerosol units. There is a specified need for topping compositions which will remain stable and immune to microbial attack, even when stored over a considerable length of time at room temperature while contained in the pressurized unit.

Topping compositions currently on the market have one or more deficiencies when markcted in aerosol units. Their shelf life even under refrigeration is relatively short due to their support of bacterial growth. Storage at ambient temperature results in even more rapid deterioration. In order to store the aerosol toppings for any length of time they must be either held in a frozen state or aseptically packed. In the latter situation generally special valves must be utilized. Both of these solutions to the problem introduce increased cost, and, as well, do not have full consumer acceptance due to the inconvenience involved.

In addition, prior art toppings in some instances do not have capability of developing a desirable heavy body at room temperature. Stiffening only occurs upon loss of taste and flavor. Also, in some instances, prior art topping compositions do not possess adequate foam stability, i.e., the foam collapses too readily after is it dispensed and it exhibits excessive syneresis. In some instances, to overcome one or more of the above deficiencies, toppings have been formulated with a high fat content. This in turn led to a high greasy mouth feel.

It would be a considerable advance in the art if an aerosol whipped topping were provided which is resistant to microbial attack even under long periods of storage at room temperature, is able to withstand changes in storage temperature conditions without undergoing undesirable changes in texture and consistency, has excellent flavor and flavor stability, and can be readily prepared and distributed at reasonable cost. In particular, if the topping not only had good room stability, but also adequate over-run throughout the entire use of the dispensing unit, the aerosol topping would be readily accepted at the market place. For example, if the over-run could be maintained at about 250%, that is, the volume of foam to dispensed liquid was about 3.5:1 over the useful life of the unit, the improved topping product would be immeasurably attractive to the ultimate consumer.

In view of the above, it therefore becomes an object of the invention to provide an aerosol topping which demonstrates excellent storage stability and resistance to microbiological attack over a considerable duration of time.

Another object of the invention is to provide a topping composition useful in aerosol distribution techniques which maintains an adequate over-run throughout the useful life of the dispensing unit.

Still another object of the invention is to provide a non-refrigerated aerated topping which is relatively low in fat content, yet still has the desired creamy-mouth feel but without a high greasy mouth feel.

In still another object of the invention, a topping composition is carefully formulated to yield a material which has a sustaining pleasing taste, but yet has relatively long storage life at room temperature, and can be dispersed from an aerosol container to provide toppings of adequate foam stability and volume.

Other objects will appear hereinafter.

In accordance with the invention a unique edible topping composition has been discovered. This composition is specially formulated to be stably confined under pressure in an aerosol dispensing container, and can be easily dispensed from the pressurized container to provide a suitable aerosol whipped topping. The primary unique properties of this topping composition are stability to microbial attack without resort to refrigeration when contained in the aerosol dispensing unit, its ability to produce adequate over-run when dispensed, and consistent maintenance of the over-run substantially throughout the use of the can or dispensing container.

More specifically, the compositions of the invention are emulsions having a solids content of about 60% to about 70% and are composed of the following ingredients in carefully controlled proportions.

TABLE I

Ingredient No.	Ingredient	Percent by weight
1	Sugar	40–60
2	Fat	5–12
3	Non-fat milk solids	0.5–6.0
4	Emulsifier:	
	(a) Fatty acid glyceride	0.4–1.1
	(b) Propylene glycol fatty acid ester	0.3–1.0
5	Water	30–40

With specific regard to the ingredients listed above, any edible sugar may be employed such as sucrose, dextrose, levulose, corn sugar, corn syrup, corn syrup solids, invert sugar or the like or any mixture or combination of these. Preferred among these are sucrose, dextrose and corn syrup. The sugar component should be present in the amounts set forth above to impart proper sweetness and concomitantly help maintain proper solids content.

The fat in the above product should be present in an amount sufficient to impart the desired creamy mouth feel without being excessive to the point of demonstrating a greasy mouth feel to the product. In the compositions of the instant invention it has been discovered that the fat content should not be greater than say abou 12.0%. Above this figure the undesired greasy mouth feel begins to come into play. The most preferred proportion of fat is 5–12% of the total composition weight. The fat itself may be chosen from a wide variety of known materials such as partially and completely hydrogenated soy bean oil, cotton seed oil, coconut oil, and blends thereof. Hydrogenated coconut oil appears most suitable here.

The relatively low fat content in the composition is one factor allowing it to be stably stored under non-refrigerated conditions. Compositions higher in fat content not only have an undesirable greasy mouth feel, but also are materially more susceptible to spoilage through microbiological attack, particularly of the bacterial type.

The non-fat milk solids content again must be carefully formulated in the proper proportions to aid in propagating one or more objects of the invention. One primary object of presence of the non-fat milk solids in the stated proportions is to aid in stabilizing the foam after expelling the topping composition from the aerosol container. The non-fat milk solid may be chosen from a variety of known

materials of this type including whey, casein and comparable materials within this class.

The emulsifier system employed in making up the instant compositions is believed to be of critical importance, both with respect to the type of ingredients making up the total emulsifier and proportions of these. It has been discovered that a special blend of emulsifiers must be employed to derive full effect of benefits described hereinafter. Specifically, the topping compositions should be composed of about 0.4% to 1.1% of a fatty acid glyceride and about 0.3% to 1.0% of a propylene glycol fatty acid ester.

In the first place the blend of emulsifiers described above co-acts to produce a weak or semi-emulsion. While this emulsion does break down somewhat in the aerosol container into aqueous and hydrophobic phases, light shaking of the can just prior to use easily restores the emulsion, allowing a homogeneous foam to be expelled. Surprisingly enough when a complete or stable emulsion was produced with other emulsifiers or combinations of emulsifiers, or the emulsifiers of the invention employed in amounts outside the ranges just stated, the topping composition when expelled from the aerosol unit did not provide sufficient over-run. That is, the volume of foam produced proportional to liquid present in emulsified form was low. In many cases the over-run was less than 100% compared to an over-run of 250% utilizing the emulsifying system of the invention. In essence, then, when a complete emulsion was produced, such emulsion when expelled from the can actually resulted in an aerated liquid and not a true foam.

Also, the proportions of ingredients making up the emulsifying system of the invention are likewise important. For example, if an excessive amount of propylene glycol fatty acid ester over that stated above is employed relative to the glycerides, there is noted a lessening in the over-run as one gradually dispenses more of the emulsion from the container. Thus, near the end of the usable life of the aerosol unit, the over-run is far below that desired. On the other hand, if one properly prepares an emulsifying system as outlined above, the over-run holds substantially constant over the entire dispensing. Again, experimentation proved that use of the glycerides alone, omitting the propylene glycol fatty acid ester, resulted in both a weak foam and a low over-run. Thus, it can readily be seen that the type and amount of emulsifiers present are extremely important in practice of the instant invention.

The just described glycerides and propylene glycol esters are derived, of course, from various fatty acids used as esterifying agents of the alcoholic materials. These fatty acid agents may be saturated or unsaturated. Unsaturated fatty acids used as esterifying agents include lauroleic, oleic, palmitoleic, myristoleic, linoleic, linolenic, and the like. The fatty acids used as esterifying agents may also be chosen from naturally-occurring sources in which a mixture of saturated and unsaturated fatty acids varying in their carbon content may be involved. For example, tallow, hydrogenated tallow, castor oil, palm oil, coconut oil, cotton seed oil, and the like may be employed as sources of esterifying agents. These natural sources vary widely as to their number and type of fatty acid constituents which go to make up the mixture. In practice of the instant invention, it has been found that stearic acid is the most preferred esterifying agent. Thus, to achieve optimum results with respect to satisfactory emulsification, as outlined above a mixture of mono and diglyceryl stearates and propylene glycol monostearate is employed in the invention.

It should be realized that various other well-known emulsifying agents may be added to the basic emulsifying compositions of this invention for their recognized and additive effect, and it is understood that such compositions are within the scope of the present invention.

In a greatly preferred embodiment, crystalline cellulose is also combined with the just-described ingredients. This material has the dual role of maintaining a consistent over-run throughout the life of the aerosol container and additionally aids in maintaining foam stability after the topping composition is expelled from the aerosol unit. Crystalline cellulose is a cellulosic material which has been hydrolysed to remove amorphous cellulosic fractions. Although the hydrolysis may be effected by various specific methods, the most direct method free of secondary reactions lies in treatment of the cellulosic material with hydrochloric acid. The cellulose resulting from the hydrolysis action of the acid on the cellulosic material reaches with time a substantially constant molecular weight. Preferred cellulose crystallites have a high degree of perfection as characterized by their X-ray defraction and a high level of chemical purity. One material of this type used in the instant invention is trademarked as Avicel. When utilized, the microcrystalline cellulose is generally present in an amount ranging from about 0.75% to about 1.25% by weight.

Additional ingredients may also be employed in preferred compositions and they include small amounts of carbohydrate materials such as gums and starches which have a bodying and water binding effect. Carboxymethyl cellulose, starches such as rice, potato, corn, tapioca, etc. significantly improved the ability of the emulsion to withstand freezing and thawing without adverse effects, and aid in stabilizing expelled foam. Additional stabilizers may also be present such as algin, sodium alginate, egg albumen, soya albumen, hydrated gelatin, or refined hydrocolloids obtained from sea plants, mainly Irish moss or carrageen. The most preferred ingredient of this type is algin gum which is generally utilized in an amount ranging from about 0.1% to about 0.4% by weight. Various other materials than those set out above may also be present in the topping compositions described herein such as vitamins, minerals, flavoring agents, dyes, colorants, etc. For example, a number of different aerated toppings may be prepared utilizing such flavorants as chocolate liquor, cocoa, strawberry, vanilla, etc. In addition, the aerated compositions may contain such ingredients as lecithin or hydroxy lecithin, citric acid, fumaric acid, and other flavoring agents than those just mentioned such as caramel, mint, butter, maple, spice, and the like.

In order to form a typical topping composition the various ingredients are first homogenized to form an aqueous emulsion. After heat processing at elevated temperatures, the emulsion is packed in an aerosol can. This can is pressurized with a propellant comprising a suitable gas or mixtures of gases, e.g., nitrous oxide with some carbon dioxide, monochloropentafluoroethane, isobutane, propane, octafluorocyclobutane, etc. One preferred mode of forming the emulsion is to add water to the algin gum, when present, to hydrate it, add the rest of the ingredients and then pressure homogenize.

It is believed that the solids content of the compositions described herein is an important factor in preventing spoilage of the materials by microbiological attack. It is thought that due to the relatively high solids content an osmotic pressure is set up which is greater than the external pressure of the organisms causing product degradation. Due to this effect, moisture is driven from the cell of the organism which is thus destroyed by dehydration. This important facet of the invention is not, of course, the only reason for the composition's resistance to attack, but is believed to be one primary cause leading to excellent product stability.

The following are examples of typical formulations of the invention. In each instance these materials had excellent storage stability characteristics at room temperature. Specifically, even after two or three months of storage time at ambient temperature, no product breakdown or spoilage was noted in any of the test samples.

COMPOSITION A—MILK CHOCOLATE AERATED TOPPING

Ingredients:	Wt. percent
Sucrose	43.000
Water	34.842
Non-fat milk powder	5.000
Hydrogenated coconut oil	8.000
50–50 mixture of propylene glycol monostearate and distilled monoglycerides	1.400
Mixture of mono and diglycerides	0.100
Algin	0.250
Microcrystalline cellulose (92% pure)	1.000
Chocolate liquor	3.000
Cocoa	3.000
Vanilla	0.340
Brown coloring	0.063
Blue coloring	0.005
	100.000

COMPOSITION B—CHOCOLATE FUDGE AERATED TOPPING

Ingredients:	Wt. percent
Sucrose	35.000
Water	32.785
Corn syrup	12.180
Hydrogenated coconut oil	7.500
Whey powder	1.000
Microcrystalline cellulose (92% pure)	1.000
50–50 mixture of propylene glycol monostearate and distilled monoglycerides	1.400
Mixture of mono and diglycerides	0.100
Algin	0.250
Chocolate liquor	4.000
Cocoa	4.000
Vanilla	0.340
Yellow coloring	0.170
Red coloring	0.170
Blue coloring	0.075
Yellow coloring	0.030
	100.000

COMPOSITION C—MARSHMALLOW AERATED TOPPING

Ingredients:	Wt. percent
Sucrose	22.83
Water	31.67
Corn syrup	20.25
Dextrose	11.00
Hydrogenated coconut oil	10.00
Whey powder	1.00
Microcrystalline cellulose (92% pure)	1.00
50–50 mixture of propylene glycol monostearate and distilled monoglycerides	1.40
Mixture of mono and diglycerides	0.10
Algin	0.25
Vanilla	0.50
	100.00

COMPOSITION D—STRAWBERRY AERATED TOPPING

Ingredients:	Wt. percent
Sucrose	22.830
Water	31.815
Corn syrup	20.250
Dextrose	11.000
Hydrogenated coconut oil	10.000
Whey powder	1.000
Microcrystalline cellulose (92% pure)	1.000
50–50 mixture of propylene glycol monostearate and distilled monoglycerides	1.400
Mixture of mono and diglycerides	0.100

Ingredients:	Wt. percent
Algin	0.250
Strawberry flavoring	0.350
Red coloring	0.005
	100.000

In addition to excellent storage stability at room temperature the above aerated toppings also demonstrated superior over-run that was consistent throughout the entire period of expulsion from the container, until the contents were exhausted. The proper amount of foam was produced whether the propellant used was a mixture of octafluorocyclobutane and nitrous oxide or nitrous oxide alone. The volume increase was approximately 250% in each case, and this amount of over-run was maintained substantially constant throughout the useful life of the aerosol can.

Besides demonstrating proper over-run and storage stability, the compositions of the invention developed the desirable heavy body at room temperature and stiffened without loss of taste or flavor. Due to their heavy body, the individual froth bubbles did not tend to break but held their shape, thus assuring that the topping remained expanded for the proper period of time. Also, even when subjected to relative extreme changes in storage temperature it was noted that the compositions did not undergo an undesirable change in texture and consistency. The creamy aerosol whipped topping had excellent texture and prolonged flavor and could undergo a number of freeze-thaw cycles without adverse effects.

While the invention has been described in connection with specific embodiments thereof, it will be understood that it is capable of further modification, and this application is intended to cover any variations, uses, or adaptations of the invention following, in general, the principles of the invention and including such departures from the present disclosure as come within known or customary practice in the art to which the invention pertains and as may be applied to the essential features hereinbefore set forth, and as fall within the scope of the invention and the limits of the appended claims.

The invention is hereby claimed as follows:

1. An edible topping composition confined under pressure in an aerosol dispensing container comprising the following ingredients having a total solids content of 60–70% by weight,

Ingredient:	Wt. percent
(1) Sugar	40–60
(2) Fat	5–12
(3) Non-fat milk solids	0.5–6.0
(4) Emulsifier:	
(a) Fatty acid mono and diglyceride	0.4–1.1
(b) Propylene glycol fatty ester	0.3–1.0
(5) Water	30–40

said composition being capable of being dispensed from the pressurized container to provide an aerosol whipped topping, and being further characterized as stable to microbial attack without resort to refrigeration when so pressurized.

2. An edible topping composition confined under pressure in an aerosol dispensing container comprising the following ingredients having a total solids content of 60–70% by weight,

Ingredient:	Wt. percent
(1) Sugar	40–60
(2) Fat	5–12
(3) Non-fat milk solids	0.5–6.0
(4) Emulsifier:	
(a) Fatty acid mono and diglyceride	0.4–1.1
(b) Propylene glycol fatty ester	0.3–1.0
(5) Microcrystalline cellulose	0.75–1.25
(6) Water	30–40

said composition being capable of being dispensed from the pressurized container to provide an aerosol whipped topping, and being further characterized as stable to microbial attack without resort to refrigeration when so pressurized.

3. An edible topping composition confined under pressure in an aerosol dispensing container comprising the following ingredients hving a total solids content of 60–70% by weight,

Ingredient:	Wt. percent
(1) Sugar	40–60
(2) Fat	5–12
(3) Non-fat milk solids	0.5–6.0
(4) Emulsifier:	
(a) Fatty acid mono and diglyceride	0.4–1.1
(b) Propylene glycol fatty ester	0.3–1.0
(5) Microcrystalline cellulose	0.75–1.25
(6) Vegetable gum	0.1–0.4
(7) Water	30–40

said composition being capable of being dispensed from the pressurized container to provide an aerosol whipped topping, and being further characterized as stable to microbial attack without resort to refrigeration when so pressurized.

4. An edible topping composition confined under pressure in an aerosol dispensing container comprising the following ingredients having a total solids content of 60–70% by weight,

Ingredient:	Wt. percent
(1) Sugar	40–60
(2) Fat	5–12
(3) Non-fat milk solids	0.5–6.0
(4) Emulsifier:	
(a) Mixture of fatty acid mono and and diglycerides	0.4–1.1
(b) Mono fatty acid ester of propylene glycol	0.3–1.0
(5) Water	30–40

said composition being capable of being dispensed from the pressurized container to provide an aerosol whipped topping, and being further characterized as stable to microbial attack without resort to refrigeration when so pressurized.

5. An edible topping composition confined under pressure in an aerosol dispensing container comprising the

following ingredients having a total solids content of 60–70% by weight,

Ingredient:	Wt. percent
(1) Sugar	40–60
(2) Fat	5–12
(3) Non-fat milk solids	0.5–6.0
(4) Emulsifier:	
(a) Mixed mono and diglyceryl stearate	0.4–1.1
(b) Propylene glycol monostearate	0.3–1.0
(5) Water	30–40

said composition being capable of being dispensed from the pressurized container to provide an aerosol whipped topping, and being further characterized as stable to microbial attack without resort to refrigeration when so pressurized.

6. The composition of claim 3 wherein said vegetable gum is derived from sodium algin.

7. The composition of claim 1 wherein said sugar is sucrose.

8. The composition of claim 1 wherein said sugar is a mixture of corn syrup and sucrose.

9. The composition of claim 1 wherein said sugar is a mixture of sucrose, corn syrup and dextrose.

10. The composition of claim 1 wherein said fat is a hydrogenated coconut oil.

11. The composition of claim 1 wherein said non-fat milk solids is whey.

12. The composition of claim 1 which additionally contains a chocolate flavoring agent selected from the group consisting of cocoa and chocolate liquor.

13. The composition of claim 1 which additionally contains a vanilla flavoring agent.

14. The composition of claim 1 which additionally contains a strawberry flavoring agent.

References Cited

UNITED STATES PATENTS

2,883,286	4/1959	Musser	99—139
3,199,988	8/1965	Kozlik et al.	99—139
3,366,494	1/1968	Bower	99—189

MAURICE W. GREENSTEIN, Primary Examiner

J. M. HUNTER, Assistant Examiner

U.S. Cl. X.R.

99—139

EXHIBIT G

United States Patent [19]

Andersen et al.

[11] **Patent Number: 4,888,194**

[45] **Date of Patent: Dec. 19, 1989**

[54] **SHELF-STABLE ASEPTIC DAIRY PRODUCT**

[75] Inventors: **Delmar L. Andersen, Baldwinsville; David J. Keller, Syracuse; Paul J. Streiff, Camillus, all of N.Y.**

[73] Assignee: **Borden, Inc., Columbus, Ohio**

[21] Appl. No.: **207,912**

[22] Filed: **Jun. 13, 1988**

Related U.S. Application Data

[63] Continuation of Ser. No. 940,095, Dec. 10, 1986, abandoned.

[51] **Int. Cl.**[4] **A23C 13/14**

[52] **U.S. Cl.** **426/570**; 426/580/613

[58] **Field of Search** 426/564, 569, 570, 580, 426/586, 588, 613, 583, 572, 804, 98, 99, 103

[56] **References Cited**

U.S. PATENT DOCUMENTS

2,137,916	11/1938	Kleerup	426/570
4,175,141	11/1979	Adam, Jr. et al.	426/522
4,208,444	6/1980	Gilmore et al.	426/570
4,251,560	2/1981	Dell et al.	426/570

OTHER PUBLICATIONS

Joint FAO/WHO Food Standards Programme, 20th Session Report, Apr. 26–30, 1982, p. 2.

Id, pp. 30 and 31.

Grade A Pasteurized Milk Ordinance (PMO) PUB. 229, 1978 Recommendations, U.S. Dept. H.E. & W., Public Health SVC/FDA, U.S. Govt., Printing Office Stock #017–001–00419–7, pp. 20, 21 and 67 respectively.

Primary Examiner—Marianne Cintins

Attorney, Agent, or Firm—Robbins & Laramie

[57] **ABSTRACT**

A shelf-stable aseptic dairy product and process for preparing the same are disclosed. The product comprises dairy ingredients, an added monoglyceride emulsifier, sodium alginate stabilizer and other optional ingredients. The process comprises (a) heating dairy ingredients to above about 60° C.; (b) combining heated dairy ingredients, added emulsifier, sodium alginate stabilizer, and other optional ingredients; (c) performing an ultra-high temperature treatment; (d) cooling; (e) homogenizing to produce a stable and uniform emulsion; and (f) further cooling and packaging the resulting cooled emulsion in an aseptic container under aseptic conditions. A shelf-stable aseptic packaged product prepared according to the disclosed process is also disclosed. The product is shelf-stable for several months and is capable of forming a stable foam upon whipping.

22 Claims, No Drawings

SHELF-STABLE ASEPTIC DAIRY PRODUCT

This application is a continuation of application Ser. No. 940,095, filed Dec. 10, 1986, now abandoned.

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to a shelf-stable aseptic dairy product which is capable of forming a stable foam upon whipping and to a process for preparing the same. The dairy product is shelf-stable for up to several months.

2. Background

For many years there has been an interest in the production of shelf-stable dairy products. Fluid dairy products can be preserved for short periods of time by refrigeration, but nonetheless deteriorate fairly rapidly due to microbiological activity. Pasteurization slows down such deterioration somewhat but does not prevent it.

While refrigerated dairy products have the advantage of fresh taste, several disadvantages exist. In addition to the inconvenience to the consumer of having to obtain fresh dairy products on a frequent basis, fresh dairy products incur costs to the distributor which translate into an increased price for the consumer; for example, the products must be distributed and marketed under cooled conditions, and dairy products which have sat on the shelf for more than a few days become unfit for consumption and must be returned to the distributor. Of particular interest, therefore, has been a dairy cream product having a long shelf life, inasmuch as dairy cream is a "Sunday product" which is typically used only on an infrequent basis.

Within the past thirty years, aseptic packaging systems have been developed to provide commercially feasible packaging of sterile dairy products intended for long term storage without refrigeration. These systems make use of ultra-high temperature (UHT) treatment. UHT treatment produces a product that is free of spoilage organisms by heating the fluid dairy product to a temperature that is high enough to kill spore-forming organisms, for a sufficiently short period of time so as to minimize the physical and chemical changes in the product itself. Common process parameters for UHT treatment are a temperature in the range of 140° C. to 150° C. for a time from 2 to 7 seconds. By utilizing the UHT treatment in conjunction with an aseptic filling system, packaged fluid dairy products can be produced that remain fresh at ambient temperature for extended periods. The techniques and equipment that are required for UHT processing and for aseptic filling are well known in the art.

While UHT processing significantly increases shelf life of dairy products, several disadvantages may result from high temperature treatment. For example, UHT-treated dairy products tend to exhibit some flavor defects and fat emulsion instability on standing. It is theorized that this instability, which manifests itself as fat separation among other thins, is most likely caused by a change in the physical relationship between the fat, casein, and denatured serum proteins in the dairy product because of the UHT processing. This problem would be expected to be particularly significant for high fat content dairy products such as whipping cream.

In order to overcome this instability, homogenization is required to obtain a uniform and stable cream emulsion. However, homogenization will reduce the whipping properties of a dairy product intended for use in making whipped cream and syneresis is often seen in the whipped foam during standing, as well as excessive gelation caused by fat clustering, especially if the product is refrigerated before use.

Yet another deficiency is that ultra-high temperature treated dairy creams often have poor whipping properties which cause the whipped foam to be too weak and to have poor stand-up, making it unsuitable for decoration purposes, such as in bakeries and restaurants.

In order to maintain a cream product in an instantly whippable form, monoglyceride emulsifiers have been added to cream products. For example, U.S. Pat. No. 4,375,485 to Van Gennip discloses the use of lactic acid esters of monoglycerides for this purpose. However, this patent requires first separating out butter fat and lactic acid from the cream in order to preserve a desirable taste quality.

It is therefore an object of the present invention to provide a whippable dairy product which has a long shelf life at room temperature.

It is a further object to provide a dairy product which is present as a stable emulsion and which, when whipped, forms a foam which has acceptable foaming properties and a uniform consistency.

It is a still further object of the invention to provide an economical process for preparing a whippable dairy product which has a long shelf life at room temperature, is present as a stable emulsion and which, when whipped, forms a foam which has acceptable foaming properties and a uniform consistency.

SUMMARY OF THE INVENTION

Accordingly, a shelf-stable aseptic dairy product is provided, which is capable of forming a stable foam upon whipping, having a fat content of about 30% to about 40% by weight, comprising (a) about 90% to about 99.5% by weight of dairy ingredients; (b) about 0.4% to about 1.0% by weight of an added monoglyceride emulsifier; (c) about 0.02% to about 0.08% by weight of a sodium alginate stabilizer; and (d) 0% to about 5% by weight of sugar.

Also provided is a process for preparing a shelf-stable aseptic dairy product, which is capable of forming a stable foam upon whipping, having a fat content of about 30% to about 40% by weight and which comprises dairy ingredients, an added emulsifier, a sodium alginate stabilizer and other optional ingredients, comprising the steps of (a) heating dairy ingredients to above about 60° C.; (b) combining the heated dairy ingredients, an added edible emulsifier, a sodium alginate stabilizer, and other optional ingredients to form a mixture; (c) performing an ultra-high temperature sterilization treatment on the mixture; (d) cooling; (e) homogenizing to produce a stable and uniform emulsion; and (f) further cooling and packaging the resulting cooled emulsion in an aseptic container under aseptic conditions.

Also provided is a shelf-stable aseptic packaged product prepared by filling an aseptic container with the emulsion prepared in the above process.

In preferred embodiments, the emulsifier is a lactylated monoglyceride and the stabilizer is a sodium alginate which is complexed with both protein and calcium.

In other preferred embodiments, the ultra-high temperature treatment is an indirect heating process, and is

performed at an adequate temperature to provide commercial sterility, followed by cooling and homogenizing at a pressure of about 500 psi to about 4000 psi.

In another embodiment, an aseptic packaged product is prepared from the disclosed process. Preferably, the product is maintained at a cooled temperature of about 1° C. to about 12° C. for a period of about two months and subsequently stored at room temperature.

DETAILED DESCRIPTION OF THE INVENTION

In its broadest embodiment, the invention relates to a shelf-stable aseptic dairy product, which is capable of forming a stable foam upon whipping, having a fat content of about 30% to about 40% by weight, comprising (a) about 90% to about 99.5% by weight of dairy ingredients; (b) about 0.4% to about 1.0% by weight of an added monoglyceride emulsifier; (c) about 0.02% to about 0.08% by weight of a sodium alginate stabilizer; and (d) 0% to about 5% by weight of sugar. (Unless otherwise indicated, all percentages are by weight.)

The dairy ingredients component is defined as having a fat content of about 30% to about 40% by weight, and preferably about 32% to about 36% by weight. The fat content of the dairy ingredient is preferably supplied entirely as dairy butter fat. However, a portion or all of the butter fat may be replaced with an oil of vegetable origin. If such a replacement occurs, however, the product will not conform to the FDA's standards of identity for a whipping cream product and would have to be identified, for example, as a "whippable topping" rather than a whippable cream product.

The dairy ingredient component may comprise dairy cream alone or in combination with whole or skim milk or milk solids in any proportions such that the desired butter fat content results.

The first essential additive of the dairy product of the present invention is an added edible monoglyceride emulsifier. While homogenization of the cream (discussed infra) aids in maintaining an emulsion of butter fat in the cream, poor whippability is demonstrated at both low homogenization and high homogenization pressures (i.e., whipping time is unsatisfactorily long).

When a low homogenization pressure is used, the fat globules of the cream are relatively large, and it is difficult to incorporate air in the cream during whipping, as the fat globules during the mechanical treatment being to churn out. This results in low overrun. This tendency toward churning also causes the foam to become stiff and water to separate from the foam soon after whipping.

When a high homogenization pressure is used, the fat globules of the cream are small, and it is relatively easy to incorporate air, resulting in a high overrun. The agglomeration tendency of the fat globules, however, is reduced, and therefore the stable foam lamellae are not formed, resulting in a very light and soft foam that collapses and separates water soon after whipping.

It has been found that, by using an added emulsifier combined with a high homogenization pressure, these small fat globules become whippable. The cream (i.e. the dairy ingredient) remains stable in liquid form, but desirably destabilizes quickly during whipping to form a stable foam with a high overrun. The monoglycerides of the present invention induce this destabilization effect on the emulsion when treated mechanically.

It has further been found that, in the liquid cream, the added emulsifier together with the protein of the cream, forms a rigid film around the fat globules. This film ensures that the cream remains stable. By using mechanical energy (applied by whipping) the protective film is broken, which allows the fat globules to agglomerate. The air incorporated in the cream will remain trapped in a foam because a hard shell consisting of emulsifier and protein is formed between fat/air and fat/water phases during whipping. Using electron microscopy of the foam, the distinct fat globules can still be seen at air/water interphases.

The added emulsifier is a monoglyceride ester. The preferred esters are lactic acid esters of monoglycerides (i.e., lactylated monoglycerides) made from edible, refined, hydrogenated vegetable fat. The preferred esters comprise palmitic and stearic acids as the main fatty acids and are about 20% to 25% esterified. A most preferred emulsifier is Lactodan P22-K, available from Grindsted Products, Inc., Industrial Airport, Kansas 66031. Lactodan P22-K has a maximum iodine value of 0.2; a maximum acid value of 0.4; saponification value of 270-300; maximum free glycerol content of 1%; and melting point of approximately 45° C.

Another suitable emulsifier is Myvatex Texture Lite (available from Eastman Kodak, Rochester, New York). This product is an aerating cake emulsifier prepared from distilled propylene glycol, monoesters blended with distilled monoglycerides, and sodium stearoyl lactylate.

The commercially available products that are sold as monoglycerides typically contain, in addition to monoglycerides, some diglyceride, some triglyceride, some free fatty acid, and some free glycerol. Some commercially available monoglyceride emulsifiers contain a substantial amount of diglyceride. It is believed that substantially all of the commercially available products sold as monoglycerides, and mixtures of monoglycerides and diglycerides, are useful in the practice of the invention. It is preferred that they be esterified further with lactic acid so that they would generally be referred to in the trade as lactylated monoglycerides or possibly as lactylated diglycerides.

The added emulsifier is generally used in an amount of about 0.4% to about 1.0% by weight based on the weight of the composition. Preferably the emulsifier is used in an amount of about 0.5% to about 0.9%; most preferably, about 0.6% to about 0.8% of the added emulsifier is used.

If less than about 0.4% of the emulsifier is used, the destabilizing effect (discussed supra) which allows for whippability is not satisfactory. Furthermore, at emulsifier levels below this amount, undesirably high viscosity results after UHT treatment and homogenization. If more than about 1.0% of the emulsifier is used, unsatisfactory off-flavors in the product are noted.

The second essential additive to the dairy ingredients of the present invention is a sodium alginate stabilizer. The stabilizer is a milk soluble sodium alginate product. Preferably, the stabilizer is a sodium alginate which is complexed with both protein and calcium.

By adding sodium alginate to the dairy ingredients, a complex consisting of calcium, protein and alginate is formed, which stabilizes the protein, preventing water separation in the dairy ingredient. The presence of calcium alone turns the sodium alginate into a gel. The sodium alginate is therefore best incorporated in the dairy ingredient at a high temperature, (i.e., above 60° C.) since at a high temperature calcium cannot form a bond with alginate as it is preferentially bound to the

protein. During cooling, the alginate becomes complexed with both protein and calcium. If, however, alginate is added to the unheated dairy ingredients, part of it will not go onto the protein, but rather make a gel with the free calcium ions present. When the dairy ingredient is homogenized at a high pressure, these calcium alginate lumps are not visible, but an increased dosage of sodium alginate will then be needed to replace calcium-bound alginate to prevent syneresis.

One preferred stabilizer is a milk soluble sodium alginate sold under the mark Marloid CMS, by Kelco, a division of Merck & Co., Inc., Clark, New Jersey 07066. Marloid CMS is a milk-soluble sodium alginate product designed for use in ultra-high temperature pasteurization systems. Marloid CMS comprises algin, tetrasasic sodium pyrophosphate, and sugar, and is available as a fine, granular powder having a solids content of 90+5%: a particle size of at least 80% through 40 mesh, U.S. Standard Sieve size (381 microns), viscosity of 40 to 175 cP (2% solution) (as measured by Brookfield Viscometer) and a pH of 9.7 to 10.4.

Another satisfactory edible additive is a stabilizer/emulsifier system which is a proprietary product sold by Dari-Tech Industries of Atlanta, Georgia, as UHT whipping cream stabilizer. Its suggested usage level with whipping cream is 0.25% by weight, or 21 pounds per 1,000 gallons of cream. It contains algin, mono and diglycerides, and dextrose. If this system is used, a separate emulsifier is not necessary.

Another preferred stabilizer is Sobalg FD 155, available from Grindsted Products, Inc., Industrial Airport, Kansas 66031.

The stabilizer is generally present in an amount of about 0.02% to about 0.08% by weight based on the weight of the composition. Preferably about 0.03% to about 0.07% of the stabilizer is used; most preferably, about 0.04% to about 0.06% is used. The amount of stabilizer needed is a function of homogenization pressure (i.e., higher levels of stabilizers are necessary at higher pressures).

Optionally, sugar may be incorporated into the composition to provide sweetness to the product. 0% to about 5% by weight of sugar may be used. Preferably, about 0% to about 2% by weight of sugar is added; most preferably, about 1.5% is used.

Additionally, artificial flavors may be incorporated into the product. Suitable flavors include fatty acids, ketones, lactones, alcohols, esters, essential oils, and other natural and artificial flavors dissolved in a suitable solvent such as propylene glycol. A preferred commercially available flavoring is Artificial Flavor #2388, available from Grinsted Products, Inc., supra. When used, the artificial flavor is present as about 0.005% to about 0.05% of the composition, preferably about 0.01% to about 0.03% of the composition, and most preferably about 0.02% of the composition.

Furthermore, standard dairy additives such as preservatives, stabilizers, emulsifiers, nutritive ad non-nutritive sweeteners, minerals, vitamins and fiber may be optionally added to the composition of the present invention. Such additives include sodium phosphate, lecithin, polysorbate 80, sodium citrate, carrageenan, calcium salts, vitamins A and D, carboxymethyl-cellulose, aspartame, saccharin, sorbitol, hydrogenated starch hydrolysate, corn syrups, fructose, dextrose, and sugar.

The process of the present invention in its broadest embodiment comprises the following steps: (a) heating dairy ingredients to above about 60° C.; (b) combining heated dairy ingredients, an added edible emulsifier, a sodium alginate stabilizer, and other optional ingredients; (c) performing an ultra-high temperature sterilization treatment; (d) cooling; (e) homogenizing to produce a stable and uniform emulsion; and (f) further cooling and packaging the resulting cooled emulsion in an aseptic container.

Before undertaking these process steps, the dairy cream may optionally be pasteurized, clarified and standardized to the desired butter fat content, according to any method commonly used in the art. When the dairy ingredients comprise a combination of pasteurized cream and milk, the milk portion must be pasteurized, clarified and standardized as well. When a combination of solids and/or milk and cream is used, the milk and cream may be blended in any large scale mixing vessel, e.g., a Lanco mixer, then pumped to a batch tank.

Before addition of any additives, the dairy ingredients are heated, preferably while mixing, to above about 60° C., and preferably above about 65° C., most preferably about 68° C. to about 72° C.

The emulsifier, stabilizer and optional ingredients are dry blended in the required proportions and added to the heated dairy ingredients in the mixer. Preferably, the additives are added in the following manner: a portion of the cream (approximately 15% or more) is heated with mixing, exercising care not to overmix and cause fat churning. The emulsifier/stabilizer/optional ingredients mix is slowly added into the vortex of the mix and heating is continued, i.e., at about 70° C. to about 75° C. The mixture is held at 70° C. with agitation for at least ten minutes to ensure that the dry blend of additives is completely dissolved. The mixture is then added to the remaining portion of the cream in a batch tank. Optional flavoring additives or other additives may be added to the batch tank at this time with thorough mixing. If the mixture is not to be further processed immediately, it is cooled to about 4° C. to about 5° C.

The mixture is next subjected to ultra-high temperature treatment in accordance with conventional ultra-high temperature (UHT) treatment processes. Two different types of UHT processing are in common usage. These are commonly referred to in the industry as the indirect process and the direct process.

In the indirect sterilization process, the cream or other liquid dairy ingredients are passed through a heat exchanger, generally a heat exchanger of the tubular or plate types. During this heat exchange process, dairy ingredients are generally passed through a tubular coil that is maintained in a very hot environment, often through the use of superheated steam.

In the direct sterilization process, steam is injected directly into the cream or other fluid dairy ingredients to heat it rapidly with maximum efficiency of heat exchange. For a description of one direct sterilization process and the equipment used, see U.S. Pat. No. 3,230,095, the disclosure of which is incorporated herein by reference. Since the injected steam condenses directly in the dairy ingredients, the condensation of the steam dilutes the ingredient with from 10% to 12% by weight of added water. This water must be removed prior to sale. Removal of the water is generally accomplished by vacuum evaporation.

Preferably, the UHT treatment is by an indirect sterilization process. The UHT treatment occurs at an adequate temperature to provide commercial sterility, i.e., about 137° C. to about 149° C.

Following UHT treatment, the mixture is cooled and passed to an homogenization apparatus. The mixture is cooled such that homogenization may be performed at about 49° C. to about 82° C., preferably about 52° C. to about 72° C. Most preferably, homogenization is performed at about 60° C. to about 65° C.

The homogenization pressure is high, i.e., about 500 psi to 4000 psi, and preferably about 1600 psi to about 3000 psi. At high pressures, the cream remains stable in liquid form but rapidly destabilizes during whipping to form a stable foam with a high overrun. Most preferably, the homogenization pressure is about 2000 psi to about 3000 psi.

The resulting dairy ingredient emulsion is then cooled to a temperature below about 27° C. and preferably below about 16° C. The emulsion product is then packaged in aseptic containers in accordance with any method known in the art. A preferred method for packaging aseptic dairy products is disclosed in U.S. application Ser. No. 807,450, filed Dec. 10, 1985, assigned to the assignee of the present invention and herein incorporated by reference. The specification of this application discloses a process for the aseptic packaging of liquid dairy products wherein a selected gas such as nitrogen is injected into the liquid, and the resulting liquid-gas mixture is filled into a container under aseptic conditions. The fill volume of the mixture is such as to leave no free space in the container when it is closed. However, upon standing, separation of the liquid-gas mixture occurs, creating a nitrogen-filled headspace.

For optional preservation of shelf life, the aseptically packaged dairy product of this invention is first "aged" at a temperature below room temperature, e.g., about 1° C. to about 12° C. Preferably the product is aged at about 5° C. or below for a period of about 20 days to 3 months, and preferably about two months. The aging process is believed to produce a controlled crystallization of glycerides in the fat globules. After this initial aging procedure, the dairy product is shelf-stable at a temperature below about 22° C. for up to about 9 months.

Immediately prior to use, the dairy product may be whipped to produce a foamed whipped cream. The product should be refrigerated (e.g., to 4° C.) prior to whipping.

EXAMPLE I

Dairy cream having a butter fat content of 32% was provided. Approximately 15% of the dairy cream (based on the final mixture) was heated to 70° C. 0.6% (by weight based on the finished product) of a lactylated monoglyceride (Grinsted Lactodan P22-K) and 0.05% (by weight, based on the weight of finished product) of a sodium alginate (Kelco Marloid CMS) were dry blended and added to the heated cream. Once the dry blend was fully dissolved in the heated cream, the mixture was added to the remaining dairy cream and ultra-high temperatures treated by indirect processing at 144° C. for four seconds, cooled to 60° C., and homogenized downstream at a pressure of 150 kg/cm^2 (2150 psi). After homogenization, the cream mixture was cooled to a temperature below 27° C. and aseptically filled in sterile containers. The cream mixture was aged at 5° C. for 24 hours to obtain complete crystallization of the triglycerides in the fat globules. The aged cream was whipped for about 1.25 minutes at maximum speed using a Sunbeam Mixmaster. No separation (syneresis) was observed after allowing the foam to stand three hours at room temperature.

EXAMPLES II AND III

The process of Example I was substantially repeated except that 0.45% (Example II) and 0.80% (Example III) of the lactylated monoglyceride emulsifier was used. Following whipping, the product was refrigerated. In both cases, an acceptable product was obtained.

EXAMPLES IV AND V

The process of Example I was again substantially repeated except that homogenization was performed at 1800 psi (Example IV) and homogenized in two steps at 2500 and 200 psi (Example V). In both cases, an acceptable product was obtained.

EXAMPLE VI

A mixture of dairy cream (40.3% butter fat) and milk (3.5% butter fat) was provided in appropriate proportions such that the mixture had a butter fat content of 32%. About 25% of the cream was heated to 158° F. 0.6% (by weight based on the finished product) of Lactodan P$_{22}$-K emulsifier was added. 0.05% Marloid CMS and 0.10 sugar (all by weight based n weight of the final product) were dry blended and added to the heated mixture. After complete dissolution, the mixture was added back to the remaining dairy mixture and ultra-high temperature treated by indirect processing at about 143 to 146° C. for five seconds and homogenized at a pressure of 2100 psi at about 74° C. After homogenization, the mixture was cooled to a temperature below 10° C. and filled into sterile containers. The cream was aged at 5° C. for 24 hours. After 3 minutes of whipping, a product having good flavor, weak to light whip body, and heavy fluid body was obtained.

EXAMPLE VII

The process of Example VI was substantially followed, except that 0.1% Marloid CMS and 0.3% Lactodan were used. After three minutes' whip time, a product having good flavor, medium fluid body and light to medium whip body resulted.

EXAMPLES VIII AND IX

The process of Example VI was substantially followed, except that 0.1% of Marloid CMS, 0.3% of Lactodan and 0.1% of sugar were used, and the mixture was homogenized at 1000 psi (Example VIII) and 2100 psi (Example IX), respectively. After 3.5 minutes and 3.0 minutes' whip time, respectively, a product with good flavor, medium fluid body and weak to light whip body was obtained.

EXAMPLE X

The process of Example VI was substantially followed, except that homogenization was performed at 500 psi. A product having good flavor, light whip body and fluid body was obtained.

EXAMPLE XI

The process of Example VI was again followed except that 1.0% Myvatex Texture Lite was substituted for the Lactodan emulsifier, the amount of Marloid was doubled and 0.3% polysorbate 80 was used. The product, after whipping for 2.5 minutes, had a good flavor, light to medium fluid body and medium whip body.

CONCLUSIONS

The present invention thus provides a shelf-stable aseptic dairy product which is capable of forming a stable foam upon whipping. Unlike prior art whipped cream products, the product of the present invention will not degrade due to bacterial growth or syneresis and possesses desirable whippability characteristics.

It has been discovered that, when an added edible emulsifier such as a lactylated monoglyceride is used, the fat globules present in the cream remain stable in liquid form but desirably destabilize quickly during whipping to form a stable foam with a high overrun. It is believed that, in the liquid cream, the added emulsifier, together with the protein in the cream, forms a rigid film around the fat globules, ensuring stability of the cream. Upon whipping this film is broken, allowing a stable, light foam to form as fat globules agglomerate.

It has further been discovered that, by adding a sodium alginate stabilizer, a complex consisting of calcium, protein and alginate is formed, which stabilizes the protein, preventing water separation in the dairy ingredient.

Therefore, by employing the requisite amounts of emulsifier, stabilizer, and optional sugar and other additives, and by processing in accordance with selected techniques, a whippable dairy prodnct possessing the above desirable characteristics may be obtained.

While the invention has been disclosed in this patent application by reference to the details of preferred embodiments of the invention, it is to be understood that this disclosure is intended in an illustrative rather than in a limiting sense, as it is contemplated that modifications will readily occur to those skilled in the art, within the spirit of the invention and the scope of the appended claims.

What is claimed is:

1. A room temperature-stable aseptic dairy product which has been subjected to an ultra-high temperature sterilization treatment and which is capable of forming a stable foam upon whipping, having a fat content of about 30% to about 40% by weight, comprising:

(a) about 90% to about 99.5% by weight of dairy ingredients;

(b) about 0.4% to about 1.0% by weight of an added monoglyceride emulsifier;

(c) about 0.02% to about 0.08% by weight of a sodium alginate stabilizer; and

(d) 0% to about 5% by weight of sugar.

2. The dairy product of claim 1 wherein the added monoglyceride emulsifier is a lactylated monoglyceride, wherein the dairy ingredients comprise fat globules and protein, and wherein the added emulsifier together with the protein forms a rigid film around the globules.

3. The dairy product of claim 1 wherein the sodium alginate stabilizer is complexed with both protein and calcium.

4. The dairy product of claim 1, wherein the product comprises about 0.6% to about 0.8% by weight of the added monoglyceride emulsifier.

5. The dairy product of claim 1, wherein the product comprises about 0.4% to about 0.06% by weight of the sodium alginate stabilizer.

6. The dairy product of claim 1, wherein the product is shelf-stable below about 22° C. for up to about 9 months.

7. A process for preparing a room temperature-stable aseptic dairy product, which is capable of forming a stable foam upon whipping, having a fat content of about 30% to about 40% by weight and which comprises dairy ingredients, an added emulsifier and a sodium alginate stabilizer, comprising the steps of:

(a) heating dairy ingredients to above about 60° C.;

(b) combining said heated dairy ingredients, added edible emulsifier and a sodium alginate stabilizer, to form a mixture;

(c) performing an ultra-high temperature sterilization treatment on said mixture;

(d) cooling the mixture of step (c);

(e) homogenizing said cooled mixture to prodnce a stable and uniform emulsion; and

(f) further cooling to a temperature below about 27° C. and packaging the resulting emulsion in an aseptic container under aseptic conditions.

8. The process of claim 7 wherein said ultra-high temperature treatment (c) is performed at an adequate temperature to provide commercial sterility.

9. The process of claim 7 wherein said ultra-high temperature treatment (c) is an indirect process.

10. The process of claim 7 wherein said heating step (a) is performed at a temperature of about 68° C. to about 72° C.

11. The process of claim 7 wherein said homogenizing step (e) is performed at a pressure of about 500 psi to about 3000 psi.

12. The process of claim 7 wherein said homogenizing step (e) is performed at a pressure of about 2000 psi to about 4000 psi.

13. The process of claim 7 wherein said emulsifier is a lactylated monoglyceride.

14. The process of claim 7 wherein said sodium alginate stabilizer is complexed with both protein and calcium.

15. The process of claim 7 wherein the cooled emulsion of step (f) is maintained at a cooled temperature of about 1° C. to about 12° C. for a period of about two months and subsequently stored at up to 22° C.

16. A process of claim 7 wherein the emulsion of step (f) comprises a liquid-gas mixture.

17. A room temperature-stable aseptic packaged product prepared according to the process of claim 15.

18. A room temperature-stable aseptic dairy product which has been subjected to an nltra-high temperature sterilization treatment and that is capable of forming a stable whipped cream-like foam upon whipping, said product having a butterfat content in the range from about 30% to about 40% by weight, comprising:

(a) from about 90% to about 99.5% by weight of dairy ingredients;

(b) from about 0.6% to about 0.8% by weight of an added lactylated monoglyceride edible emulsifier;

(c) from about 0.04% to about 0.06% by weight of a milk soluble sodium alginate stabilizer; and

(d) 0% to about 5% by weight of sugar.

19. The product of claim 18 which, after storage at a temperature in the range of about 1° C. to about 12° C. for at least two months, is shelf-stable below about 22° C. for up to about 9 months.

20. A process for preparing a room temperature-stable dairy product in an aseptic package, that is capable of forming a whipped cream-like stable foam upon whipping, said product having a fat content of from about 30% to about 40% b weight and comprising dairy ingredients, an added edible emulsifier and an edible stabilizer, comprising the steps of:

(a) heating said dairy ingredients to a temperature in the range from about 68° C. to about 72° C.;

(b) combining said heated dairy ingredients, added edible emulsifier and sodium alginate stabilizer, to form a mixture;

(c) performing an ultra-high temperature sterilization treatment of said mixture;

(d) cooling said mixture of step (c);

(e) homogenizing said cooled mixture at a pressure in the range from about 500 psi to about 4000 psi, to produce a stable and uniform emulsion from said mixture; and

(f) further cooling to a temperature below about 27° C. and packaging the resulting emulsion under aseptic conditions in a closable container for storage.

21. The process of claim 20 wherein said homogenizing step (e) is performed at a pressure in the range from about 2000 psi to about 4000 psi, and said added edible emulsifier is a lactylated monoglyceride.

22. A process of claim 20 wherein the emulsion of step (f) comprises a liquid-gas mixture.

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